

**Final Environmental Assessment  
and  
Finding of No Significant Impact and Decision  
for  
Management of Conflicts Associated with Non-migratory (resident) Canada  
Geese in the Puget Sound Area**

**November 1, 1999**

**Prepared by:**

**UNITED STATES DEPARTMENT OF AGRICULTURE  
Animal and Plant Health Inspection Service  
Wildlife Services**

**In Consultation with:**

United States Department of Interior  
Fish and Wildlife Service  
and  
Washington Department of Fish and Wildlife

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## LIST OF ACRONYMS

AAWV	American Association of Wildlife Veterinarians
ADC	Animal Damage Control (former name of Wildlife Services program)
APHIS	Animal and Plant Health Inspection Service (USDA agency)
AVMA	American Veterinary Medical Association
AWACS	Airborne Warning And Control System
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
DNR	Department of Natural Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
et al.	et alia (and others)
FAA	Federal Aviation Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding Of No Significant Impact
FY	Fiscal Year (October 1 through September 31)
IWDM	Integrated Wildlife Damage Management
INAD	Investigational New Animal Drug
MA	Methyl Anthranilate
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
NEPA	National Environmental Policy Act
NWRC	National Wildlife Research Center
RCW	Revised Code of Washington
RNA	Ribonucleic acid
SWMC	Seattle Waterfowl Management Committee
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service (USDI agency)
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WS	Wildlife Services (USDA-APHIS program)

## 1.0 PURPOSE AND NEED FOR ACTION

### 1.1 Introduction

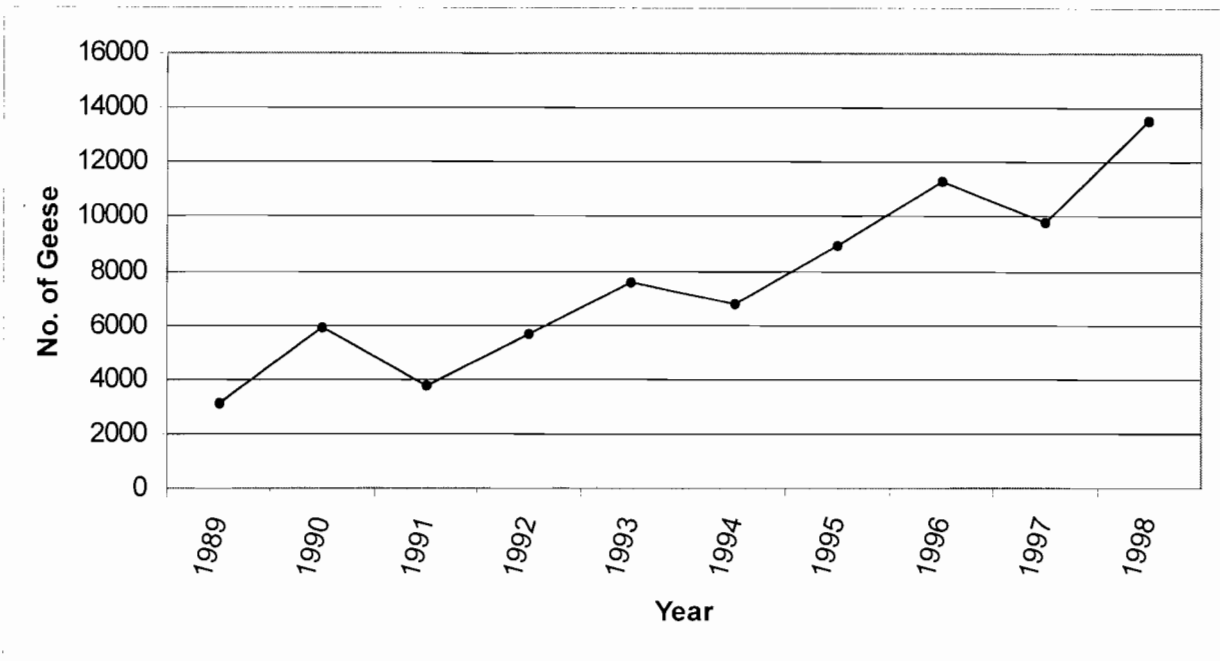
Western Canada geese (*Branta canadensis moffitti*) were a rare occurrence in the Puget Sound area 30 years ago. Since that time, their population has dramatically increased throughout the Puget Sound region due to relocations of geese by state and federal wildlife agencies in the 1960's and 1970's, and natural range expansion from eastern Washington (Figs. 1 and 2). Puget Sound is located in the Northwestern portion of Washington State (Fig. 3). Many people have enjoyed seeing geese in areas where they were previously absent or occurred only as seasonal migrants. However, as goose numbers increased, so did many of the problems that they caused (USDA, MIS 1989 - 1998). Concentrations of geese in the vicinity of airports have posed threats to safe aircraft operations (Seubert, 1996). Canada geese and their droppings have caused property damage in both public and private settings (public involvement, 1998 - 1999) public beaches and swimming areas have been closed, and numerous parks and athletic fields have been contaminated with fecal matter. Public involvement has also documented a negative impact on the quality of life of many residents, due to what many consider an overabundance of Canada geese.

Wildlife Services' (WS) initial efforts to manage problems caused by resident Canada geese have focused on providing advice to property owners, relocating geese to other parts of the state, and addling<sup>1</sup> the eggs of geese in problem areas. In 1997 and 1998, the WS program resorted to the lethal removal of 450 geese from three sites. During this same 2-year period, an additional 128 geese were lethally removed from miscellaneous trouble spots, mostly in the Puget Sound area (USDA, MIS 1997 and 1998). Captured geese were euthanized in accordance with American Veterinary Medical Association (AVMA) standards (AVMA 1993). This was the first time that lethal control of geese had been used by WS to this extent in Washington. These removals were welcomed by resource owners and much of the public and were successful in reducing goose damage. However, the removals were also considered controversial by some people.

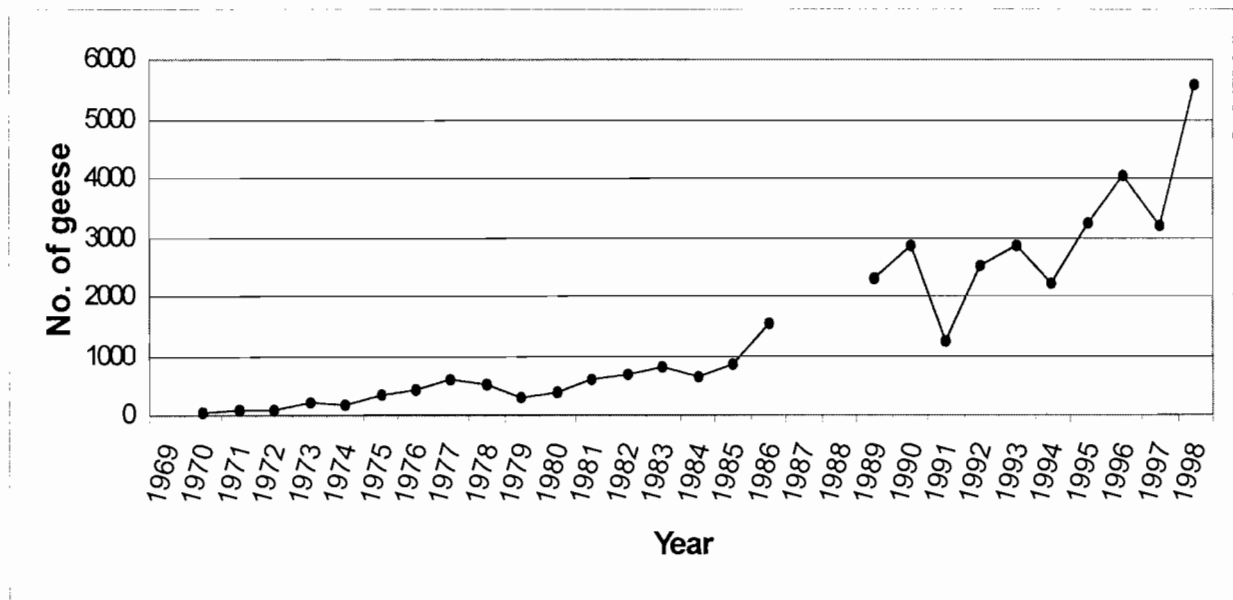
The purpose of this Environmental Assessment (EA) is to evaluate the issues and alternatives for managing damage caused by resident Canada geese, and to develop future management options in the greater Puget Sound area.

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<sup>1</sup> Addling refers to oiling, addling, or puncturing eggs. Oiling eggs prevents gases from diffusing through an egg's outer membranes and pores in the shell, thereby causing the embryo to die of asphyxiation (Blokpoel and Hamilton 1989, Christens et al. 1995). Addling (or shaking) involves vigorously shaking the eggs until sloshing is heard, thus destroying the embryo. Puncturing is done by pushing a thin, strong pin through the shell, which introduces bacteria. Eggs are replaced so that the female goose continues to incubate in a futile attempt to hatch them.

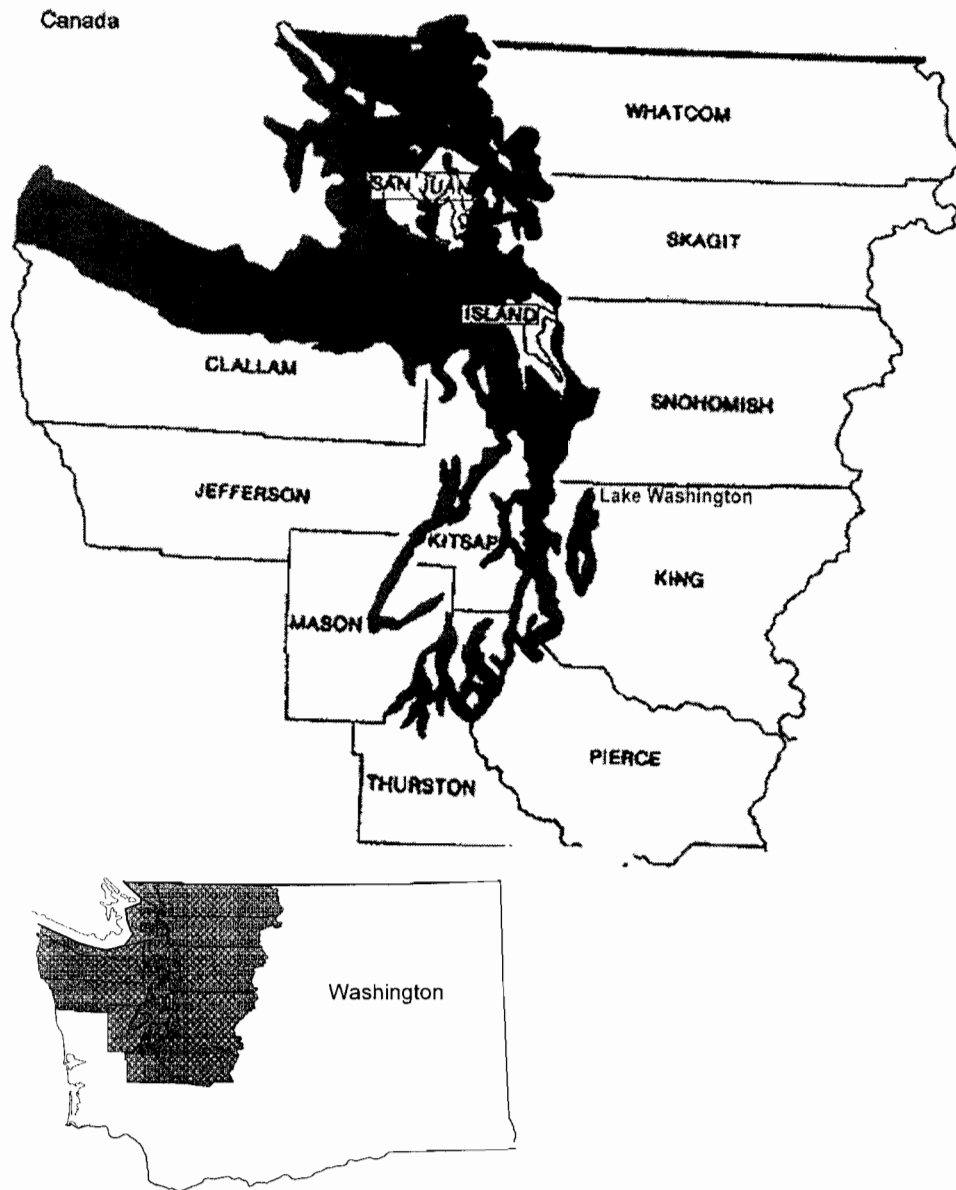


**Figure 1.** Ten-year Canada goose population trend for Puget Sound based on Audubon Society Field Notes and American Birds.



**Figure 2.** Thirty-year Canada goose population trend for the cities of Olympia, Seattle, and Tacoma based on Audubon Society Field Notes and American Birds.

# Puget Sound Area



**Figure 3.** Puget Sound and the surrounding Counties in the State of Washington.

## **1.2 Public Involvement**

### *Solicitation for Input, Information, and Issues:*

WS used the information gathered from agency personnel, the U.S. Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDFW), and the public in preparing this document. Public input was obtained through written comments provided in response to a public involvement letter. Three hundred and seventy-seven public involvement letters were sent to state, federal, county, and municipal agencies, businesses, animal welfare and animal rights organizations, and individuals. The public involvement letter invited information concerning the issues and alternatives involving resident Canada goose damage. Seventy-one letters were received in response to the invitations. The issues and alternatives identified in this process have been considered in this document.

### *Agency Review:*

Following the public involvement process the preliminary EA was presented to the consulting agencies (USFWS and WDFW) for an interagency review.

### *Public notice of Availability:*

Legal notices of availability were placed in; *The Seattle Times*, *The Bellingham Herald*, and *The Olympian*, on April 26, 1999. All respondents to the public involvement process and all persons requesting a document received the predecisional EA. A 30-day comment period, closing on May 26, 1999 was offered and an additional 15 days, closing on June 10, 1999 was granted to all who requested an extension.

In excess of 350 predecisional EAs were issued and 139 comment letters were received. A data base and mailing list of 629 interested persons, groups and agencies were involved in this process.

## **1.3 NEPA Compliance**

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 [42 USC Section 4321 et seq., as implemented by the Council on Environmental Quality (CEQ) Regulations, 40 CFR Section 1500 - 1508]. According to APHIS procedures implementing NEPA, individual wildlife damage management actions are categorically excluded from the requirement to prepare an EA [7 CFR 372.5 (c), 60 Fed Reg. 6,000 - 6,003, 1995]. However, to facilitate planning, interagency consultation, and involve the public in the resolving of Canada goose damage in the Puget Sound area, WS has elected to prepare this EA.

An Environmental Assessment (EA) is a concise public document for which a Federal agency is responsible that serves to:



- (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).
- (2) Aid an agency's compliance with the NEPA when no EIS is necessary.
- (3) Facilitate preparation of an EIS when one is necessary.
- (4) Provide brief discussions of the need for the proposal, of alternatives as required by Section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted (40 CFR 1508.9).

WS, formerly known as Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1994) to which this EA is tiered. In addition, pertinent and current information available in the Final EIS has been incorporated by reference into this EA.

#### **1.4 Need for Action**

All Canada geese are managed by the USFWS as "Migratory Waterfowl" under the Migratory Bird Treaty Act. However, not all Canada geese migrate in the true sense of the word. Some are considered resident geese. Resident Canada geese are defined as those non-migratory Canada geese that nest and reside predominantly within the conterminous United States (Rusch et al. 1995, Ankney 1996, Grandy and Hadidian 1997, USDI 1998<sup>a</sup>).

Canada geese are perhaps the most widely recognized birds in North America. Geese flying in a V formation signal changes in season and for many people have come to symbolize nature and wildlife (Smith et al. 1999). They are generally regarded as providing ecological, educational, economic, recreational, and aesthetic benefits (Decker and Goff 1987), and there is enjoyment in knowing wildlife exists and contributes to the stability of natural ecosystems (Bishop 1987). Most people view Canada geese as a charismatic and highly valued species, however, individual tolerance of goose behavior differs (Smith et al. 1999).

Increasing populations of these locally-breeding geese (Rusch et al. 1995, Ankney 1996) are resulting in increasing numbers of conflicts with human activities (Conover and Chasko 1985, WS annual tables), and increasing concerns related to human health and safety (Ankney 1996, Public involvement). There is a direct link between the number of resident geese and the amount of damage inflicted upon a community. This direct link sometimes requires that WS indirectly manage local populations while fulfilling its authority to manage damage.

#### *Background:*

The western Canada goose subspecies is considered non-native to the Puget Sound area. Some were introduced in the 1960's when McNary and John Day Dams were completed on the Columbia River, through a program to remove eggs from rising water levels (Manuwal 1989). Others were released through relocations from damage areas, and there has also been natural

expansion of their range from eastern Washington (Kraege, pers. comm.). Further introductions of Canada geese into Puget Sound were made by the WDFW in 1968 in conjunction with the flooding of the John Day pool (Kraege pers. comm.). The goose population in Puget Sound has flourished over the years and their numbers have increased exponentially (Figs. 1 & 2).

The overabundance of Canada geese in many urban areas has been human-caused, albeit unintentional and indirect (Ankney 1995). Geese are primarily herbivorous. They graze on plants or parts of plants that are high in protein such as grass shoots, seed heads, and aquatic vegetation. The Puget Sound area is a virtual goose paradise consisting of well-kept lawns, golf courses, parks, and recreational fields, many of which are located on shoreline sites. The Puget Sound, lakes, reservoirs, ponds, marshes, rivers, and streams, all of which are frequently dotted with islands, provide safe nesting sites and offer attractive habitat for geese. In addition, the traditional predators of geese (foxes, coyotes, etc.) are present in low numbers or are absent in most urban areas. Hunting pressure from people is also minimal. The large body mass of western Canada geese enables them to survive moderately cold climates and allows them to reside in the area year around. Unlike the migrant Canada geese that move north in the spring to nest in Canada and Alaska and south again for the winter, resident geese spend the entire year in the local area (WS banding data, 1989 - 1998).

#### *Expanding Population:*

A 10-year population trend for the Puget Sound area shows an increase from 3,110 geese in 1988 to 13,512 geese in 1997, a 434% increase (Fig. 1). A similar 30-year trend for the Olympia, Seattle, and Tacoma surveys, shows the beginnings of an exponential population growth curve starting with only 36 geese in 1969 and growing to 5,591 geese by 1997 (Fig. 2). Breeding bird survey routes in the Puget Sound area (which underestimate species not commonly seen along roadsides, i.e. waterfowl) indicate a 10-fold trend increase for resident Canada geese (North American Breeding Bird Survey 1971 - 1997).

#### *History:*

In 1987, the growing population of resident Canada geese and the problems they were causing, in and around Seattle prompted the formation of the Seattle Waterfowl Management Committee (SWMC). The SWMC was comprised of representatives from cities and parks in the greater Seattle Metropolitan area. In 1988, concerns about drastically increasing goose complaints led the committee to contract with D. A. Manuwal, PhD. University of Washington, to complete a 12-month, \$18,259 study (Manuwal 1988). Manuwal (1990) recommended that substantial reductions of goose numbers (90% or 2,814 geese in 1990, and 80 - 90% in 1991 in conjunction with a reduction in reproduction and the total removal of domestic geese) would be needed to control the burgeoning population. Manuwal noted that smaller annual reductions would be needed in the future to maintain control of the population.

Upon completion of the University of Washington study, the SWMC sought assistance from WS

and provided funding to remove geese from the area. Between 1990 and 1995, WS captured and transported 7,342 geese to relocation sites in eastern Washington and northern Idaho. The relocations were effective in reducing the number of complaints and the amount of damage reported in the Seattle area. However, it became evident that some relocations resulted in new goose problems elsewhere. In addition, wildlife managers had concerns that relocating geese could result in the spread of waterfowl diseases into populations of migrating geese [American Association of Wildlife Veterinarians (AAWV), undated]. Relocations were phased out and control efforts turned toward the addling of eggs. Between 1992 and 1998, WS addled 6,336 eggs. However, in the absence of goose removal, addling provided insufficient control of goose numbers and there was a corresponding increase in damage complaints.

Statewide, WDFW recorded a 240% increase in goose-related complaints from 1995 to 1998 (Carrell, pers. comm.). From 1989 (the first year individual records were kept for geese) through 1998, \$4.9 million in goose-caused damages were reported to WS for Washington State (USDA-APHIS-WS MIS). In King County alone, the number of goose complaints received by WS increased from 66 incidents totaling \$13,746 in 1993 (the first year separate records were kept for counties) to 146 incidents totaling \$930,903 in 1998 (WS MIS).

#### *Threat to Human Health:*

A foraging Canada goose defecates between 5.2 and 8.8 times per hour (Bedard and Gauthier 1986), producing approximately 3 pounds of feces every day (USDI 1998<sup>b</sup>). Kear (1963) recorded a maximum fecal deposition rate for Canada geese of .39 pounds per day (dry weight)(IN Allan 1995) . Threats to human health from goose fecal contamination have caused problems in the Puget Sound area in recent years. In 1998, Kitsap County Health Department closed three beaches, and King County Health Department closed five. Beaches were closed when fecal coliform (*Escherichia coli*) levels rose above those set by the Ten States Standard developed by the Federal Water Pollution Control Federation<sup>2</sup>. Genetic testing (RNA analysis) of samples taken from Juanita Beach in 1998 identified geese and ducks as the primary source of fecal contamination (Frodge 1998, Jamieson, R. L. 1998). One puddle in the play area at Juanita Beach contained fecal coliform counts greater than those found in raw sewage [King County Department of Natural Resources (DNR) Report 1998]. A King County cafeteria was also closed due to coliform contamination from goose fecal matter being tracked in (public involvement). Although it is uncertain whether the *E. coli* found in goose feces causes illness in humans, people have been reported to have become sickened after swimming at contaminated beaches (public involvement). Most people would agree that exposing the public to high levels of potentially hazardous fecal bacteria should be avoided, regardless of the source. Determining which species are the source of coliform contamination requires lengthy and expensive testing. Health

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<sup>2</sup>Local Health Districts utilize levels of fecal coliform (FC) bacteria within swimming areas as an indicator of the human health risks associated with direct water contact. Levels of FC are then compared against the Ten States Standard which reads as follows: Part 1. Fecal coliform organism levels shall both not exceed a geometric mean value of 200 colonies/100 ml; and Part 2. Not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 400 colonies/100ml.

departments currently rely upon the Ten States Standard for ensuring public health and beaches are closed whenever coliform counts exceed the standard, regardless of source species (Frodge pers. comm.).

In addition to *E. coli*, there are several pathogens involving waterfowl which may be contracted by humans, however, the risk of infection is believed to be low (Friend et al., 1987). These include:

Cryptosporidiosis is recognized as a disease with implications for human health (Smith et al. 1997). It is a disease carried by waterfowl, caused by the parasite *Cryptosporidium parvum*. Persons have been infected by drinking contaminated water or by direct contact with the droppings of infected animals [Centers for Disease Control (CDC) 1995]. The public is advised to be careful when swimming in lakes, ponds, streams, and pools, to avoid swallowing water while swimming, and to avoid touching fecal matter (Colley 1996). It has been shown, using molecular techniques, that Canada geese disseminate infectious *Cryptosporidium parvum* oocysts in the environment (Graczyk et al. 1998).

Giardiasis is an illness caused by a microscopic parasite *Giardia lamblia*. It is recognized as one of the most common causes of waterborne disease in humans in the United States (CDC 1998). Giardiasis is contracted by swallowing contaminated water or putting anything in the mouth that has touched fecal matter from an infected animal (CDC 1998). *Giardia* sp. oocysts have been found in the feces of Canada geese (Graczyk et al. 1998) and may have serious implications for the contamination of watersheds (Davidson and Nettles 1997, Smith et al. 1997, Upcroft et al. 1997. In Graczyk et al. 1998).

Salmonellosis, a group of diseases caused by the bacteria *Salmonella spp.*, is contracted by handling materials soiled with bird feces (Stroud and Friend 1987). *Salmonella* are well documented as human pathogens. "food poisoning", characterized by acute intestinal pain and diarrhea, is the most common form of human infection. However, more serious forms of salmonellosis, such as paratyphoid, also occur in humans. Paratyphoid infections are frequent in waterfowl (Stroud and Friend 1987).

Chlamydiosis, a disease frequently caused by the parasite *Chlamydia psittacci*, is contracted by direct contact with infected birds and inhalation of the causative organism in airborne particles (Locke 1987). Chlamydial infections are common in waterfowl (Locke 1987). Severe cases of chlamydiosis have occurred among wildlife biologists known to have handled waterfowl (Wobeser and Brand 1982).

Geese can also act as a host species in the life cycle of the schistosome parasites which cause cercarial dermatitis ("swimmers itch") in humans (Blankespoor and Reimink 1991, CDC 1992). The schistosome requires two hosts, one being one of several species of snail, and the other being one or more species of waterfowl (Guth et al. 1979, Blankespoor and Reimink 1991, Loken et al. 1995).

Influenza A viruses are known to emerge from the aquatic avian reservoir and cause human pandemics (Schafer et al. 1993). Virtually all influenza viruses in mammalian hosts originate from the avian gene pool (Webster et al. 1993). Ito et al. (1995) studied the strains of avian

influenza virus in Alaska waterfowl, to learn whether they harbored Asian strains that would indicate a connection to birds migrating from Asia. They found North American strains of avian influenza virus in small numbers in ducks, geese and lakes in southcentral Alaska, including geese and lake water of Lake Hood in Anchorage.

Avian tuberculosis, usually caused by the bacterium *Mycobacterium avium*, is contracted by direct contact with infected birds, ingestion of contaminated food and water, or contact with a contaminated environment. All avian species are susceptible but the prevalence of tuberculosis in waterfowl has not been determined (Roffe 1987). There are many authenticated cases of *M. avium* infection in people (Roffe 1987).

Transmission of disease or parasites from geese to humans has not been well documented, but the potential exists (Luechtefeld et al. 1980, Wobeser and Brand 1982, Hill and Grimes 1984, Pacha et al. 1988, Blandespoor and Reimink 1991, Graczyk et al. 1997). In worst case scenarios, infections may even be life-threatening for immunocompromised and immunosuppressed people (Roffe 1987, Virginia Department of Health 1995, Graczyk et al. 1998).

#### *Threat to other wildlife:*

In large concentrations, resident Canada geese, feral geese, and hybrids create a reservoir for disease and pose a health threat to migrating waterfowl. Tens of thousands of migratory waterfowl have been killed in single die-offs, with as many as 1,000 birds succumbing in 1 day (Friend and Franson 1987). For this reason, the American Association of Wildlife Veterinarians (AAWV) put forth the following resolution:

“...the AAWV encourages local authorities and state and federal agencies to cooperate to limit the population of waterfowl on urban water areas to prevent disease outbreaks in semi-domestic as well as free-ranging ducks, geese and swans and discourages the practice of relocating nuisance or excess urban ducks, geese and swans to other parks or wildlife areas as a means of local population control”.

#### *Threat to Human Safety:*

Bird strikes cause an estimated seven fatalities and \$245 million damage to civilian and military aircraft each year (Linnell et al. 1996). In 1995, a Boeing 700 AWACS jet taking off from Elmendorf Air Force Base in Alaska ingested geese into the number 1 and 2 engines and crashed, killing all 24 crew members and destroying the \$180 million aircraft.

At least nine goose strikes have occurred to aircraft in the Puget Sound area since 1990 (FAA Wildlife Strike Database). On August 31, 1998, a flock of five or six resident Canada geese was struck by a medical transport jet while landing at Renton Municipal Airport. The aircraft was preparing to transport an individual for an emergency medical procedure, but the flight had to be canceled. Had this incident occurred during takeoff, a potentially fatal situation may have occurred due to power loss to one engine, wing and flap penetration, and damage to the landing gear. Another strike occurred at SeaTac International Airport in 1995 when a Boeing 737

passenger jet struck seven geese while on final approach, damaging the radome of the aircraft. Fortunately, there were no injuries to people in either incident, although there were several hundred thousand dollars in damage reported. On October 23, 1994, a general aviation aircraft (C-310) was on approach to Paine Field / Snohomish County Airport when it hit a flock of geese at approximately 100 feet above the runway. Although the pilot and passenger were not injured, severe damage did occur to the leading edge of the aircraft. Although most strikes happen in close proximity to airports during landings and takeoffs, aircraft conducting low level flights at other locations are also vulnerable, particularly over areas hosting concentrations of birds. An example of this occurred on December 10, 1998 at McMinnville, Oregon, when a Military C-130 conducting a low level flight struck a flock of Canada geese approximately 6 miles from the airport. No injuries to pilot or crew were reported. However, the aircraft was severely damaged. It is estimated that only 20 - 25% of all bird strikes are reported (Conover et al. 1995, Dolbeer et al. 1995, Linnell et al. 1996, Linnell et al. 1999), hence, the number of strikes involving Canada geese is likely greater than FAA records show.

#### *Attacks / Hazards:*

Geese in urban areas aggressively defend their nests or goslings and may attack or threaten pets, children, and adults (Smith et al. 1999). WS records show that goose attacks on people are fairly common occurrences during the nesting season and can result in injuries. There were 11 references made regarding goose attacks on people in response to the public involvement for this EA. In 1998, a 57-year-old woman was knocked to the ground and attacked by two Canada geese. The attack left her with a swollen and bruised face, two black eyes, a 3-inch scratch down her cheek, and a concussion (Oregonian 1998). Slipping hazards are caused by the buildup of fecal matter from geese on docks, walkways, and other foot traffic areas (public involvement). Elderly people are especially vulnerable to broken bones if they slip and fall or are knocked down by geese. They are also more vulnerable to medical complications such as pneumonia from such injuries (public involvement). WS records show traffic hazards result from geese straying onto busy streets and highways and can result in accidents as vehicles stop suddenly or swerve to miss them.

#### *Damage to Property / Natural Resources / Quality of Life:*

Soil erosion and other damage caused by geese to landscaping (Laycock 1982, Conover and Chasko 1985), gardens, golf courses, public parks, and cemeteries are well documented throughout the Puget Sound area (USDA, MIS 1993 - 1998). The costs of reestablishing overgrazed lawns and cleaning goose droppings from sidewalks have been estimated at more than \$60 per bird (Allan et al. 1995). In 1998, resident geese at a military installation in Puget Sound activated security systems in a nuclear arms storage area so frequently as to compromise the security of the facility (WS records).

Ecological damage to area lakes from resident geese has been documented since the early 1980's. In a Washington State study of Lake Ballinger, fecal matter from geese was found to be the major

source of phosphorus in the lake. The resulting “phosphorus loading” of the lake enhanced the formation of excessive algae blooms, which in turn caused depletion of dissolved oxygen in the deeper waters. This degradation of water quality reduced habitat for fish and invertebrates and further enhanced the recycling of phosphorus from the bottom sediments. Phosphorus loading from fecal matter is a serious ecological concern that has become a common problem in the Puget Sound area (WDOE 1999).

The majority of respondents to the public involvement process of this EA described a general decline in their quality of life due to local overabundances of geese. People reported being unable to use and enjoy their own property, public parks, and other areas because of goose droppings. Piers, yards, boats, beaches, roads, parks, golf courses, landscaping, driveways, athletic fields, ponds, lakes, rafts, porches, patios, gardens, foot paths, wading pools, play grounds, irrigation ponds, school grounds, cemeteries, and reservoirs have all been negatively affected (public involvement 1998 - 1999). Goose feces tracked into homes, restaurants, cafeterias, schools, club houses, offices, daycare centers, and stores have contaminated and damaged these facilities (public involvement 1998 - 1999).

### **1.5 Purpose and Scope**

The purpose of the proposed goose damage management activities in the Puget Sound area is to reduce or alleviate damage to property, natural resources, human health, and public safety.

This EA examines potential environmental impacts of the proposed WS program and alternatives, as it responds to requests from individuals, businesses, associations, and government agencies to alleviate actual and potential damage by resident Canada geese in the greater Puget Sound area. Most of the geese are of the western subspecies *Branta canadensis moffitti* but some hybridization with feral geese and other introduced subspecies of Canada geese has likely occurred (Kraege, pers. comm.). For the purpose of this EA, resident Canada geese refers primarily to a locally breeding population of geese which nest and raise their young in the Puget Sound area. Puget Sound lies in the northwestern portion of Washington State and encompasses all or portions of Whatcom, Skagit, Snohomish, King, Pierce, Thurston, Mason, Kitsap, Island, Jefferson, Clallam, and San Juan Counties (Fig. 3). Current program activities are conducted on private, municipal, county, state, and federal lands.

This EA will remain valid until WS and other appropriate agencies determine that new needs for action, changed conditions, or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document may be supplemented pursuant to NEPA. Review of the EA will be conducted periodically to ensure the EA is still sufficient.

### **1.6 Authority and Compliance**

### *Wildlife Services:*

WS is directed by law to protect American agriculture and other resources from damage associated with wildlife. “Wildlife damage management” is defined as the alleviation of damage or other problems caused by, or related to, the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991). The primary statutory authority for the WS program is the Animal Damage Control Act of March 2, 1931, as amended (7 U.S.C. 426-426c; 46 Stat. 1468). In 1988, Congress strengthened the legislative authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. WS activities are conducted in cooperation with other Federal, state and local agencies; and private organizations and individuals.

### *Consulting Agencies:*

#### United States Fish and Wildlife Service (USFWS):

The Service’s authority for action is based on the Migratory Bird Treaty Act (MBTA) of 1918 (as amended) and the Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act [Sec. 2(c)].

#### Washington Department of Fish and Wildlife (WDFW):

The Department’s authority for managing wildlife in the State of Washington is based on Washington State Chapter 77.12 RCW.

Most Canada geese in Washington, both resident and migrant, are managed under federal authority by the USFWS in cooperation with the WDFW. WS is authorized by federal law to assist the public in resolving conflicts with wildlife. WS coordinates with and reports to the USFWS and WDFW.

See Appendix 1 for further discussion of agency authorities.

## **1.7 Compliance with statutes**

Several federal laws regulate WS wildlife damage management. WS complies with these laws and regulations, consults with, reports to, and cooperates with other agencies as appropriate.

**National Environmental Policy Act.** Environmental documents pursuant to NEPA must be completed before a NEPA decision can be implemented. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern. Typically, federal agencies that fund WS assistance to protect resources are responsible for NEPA compliance. For example, the FWS would be responsible for NEPA compliance regarding efforts conducted by WS at the request of, and funded by, the FWS for



protection of endangered species.

**Endangered Species Act (ESA).** It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the FWS to use the expertise of the FWS to ensure that “any action authorized, funded or carried out by such an agency. . . is not likely to jeopardize the continued existence of any endangered or threatened species. . . Each agency shall use the best scientific and commercial data available” (Sec. 7(a)(2)).

**Migratory Bird Treaty Act (MBTA).** The MBTA provides the FWS regulatory authority to protect species of birds that migrate outside the United States . The law prohibits any “take” of the species, except as permitted by the FWS or by federal agencies within the scope of their authority; therefore the FWS issues permits for managing wildlife damage situations. WS will obtain MBTA permits covering management activities that involve the taking of species for which such permits are required in accordance with the MBTA and USFWS regulations, or will operate as a named agent on MBTA permits obtained by cooperators.

**Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).** FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All pesticides used by the WS program in Washington are registered with and regulated by the EPA and Washington Department of Agriculture, and used by WS in compliance with labeling procedures and requirements. No toxicants are currently are used or registered for use in controlling geese.

**Investigational New Animal Drug (INAD).** The Food and Drug Administration (FDA) grants permission to use INAD (21 CFR, Part 511). Alpha chloralose is now classified as an INAD (21 CFR 510) and cannot be purchased from any source except WS. The FDA authorization allows WS to use alpha chloralose to capture geese, ducks, coots, and pigeons. FDA acceptance of additional data will allow WS to consider requesting an expansion in the use of alpha chloralose for more species.

## **2.0 ALTERNATIVES**

The following alternative courses of action were identified in responses to the public involvement process.

### **2.1 Alternative 1: Current Program (No Action) Alternative**

Alternative 1, the Current Program Alternative is used as the baseline for comparison with the other alternatives, therefore, more information and description is provided under this definition and under the analysis of its possible environmental impacts. Alternative 1 is the “No Action” Alternative. The “No Action” Alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), and is a viable and reasonable alternative that could be selected.

Standard operations include WS direct control (see “direct control”, page 15) and technical assistance (see “technical assistance”, page 14) applied on a case-by-case basis. The most appropriate, effective and biologically sound methods are used to resolve damages caused by resident Canada geese. This approach is known as Integrated Wildlife Damage Management (IWDM) and is analyzed and discussed in Chapter 1, 1 - 7 of The Animal Damage Control Program Final EIS (USDA 1994). In general terms, IWDM is comprised of all the methods available to resolve a particular wildlife problem. These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. The control of wildlife damage may also require that the offending animal(s) be removed or that populations of the offending species be reduced through lethal methods. WS control methods are usually employed only when requested and funded. Methods are implemented at the field level through a decision making process known as the WS Decision Model (Appendix 3). The magnitude, geographic extent, frequency, and duration of the problem are used to determine if action is warranted. Appendix 2 lists the WS wildlife damage management methods.

Under the Current Program, IWDM has been modified to focus on nonlethal control and technical assistance. Lethal control has been restricted to specific, limited circumstances related to human health and safety concerns. Primarily due to social concerns, nonlethal control and technical assistance have been used under circumstances where lethal control would have been more effective and biologically sound.

#### *Technical Assistance:*

WS provides technical assistance to the public through verbal or written advice, recommendations, information, demonstrations and training, and distributes literature and materials for others to use in managing goose problems. Technical assistance is usually provided following a verbal consultation or an on-site visit to determine the nature and history of the problem, extent of damage, and identification of the species responsible for damage.

Assistance may be given to identify the responsible wildlife species and determine the extent of damage. WS may provide recommendations concerning habitat modification, removal of attractants, changes in cultural practices, behavior modification of the troublesome species, or ways to reduce specific wildlife populations to control the amount of damage they cause. Explanation of the biology, behavior, and population ecology of the species responsible for damage is occasionally sufficient to satisfy the resource owner’s information needs and may result in no damage control actions being taken.

WS personnel most frequently suggest nonlethal techniques in resolving conflicts with resident geese. Recommendations may include, but are not limited to, habitat modification and manipulation, scaring techniques, human behavior modification, physical barriers, and repellents. From 1992 through 1998, WS provided 1,786 technical assistance recommendations for nonlethal methods and loaned or issued a variety of tools to implement hazing methods for Canada geese. These tools included 104,400 ft. of flagging and mylar tape, 13 "Terror Eyes" balloons, 204 pyrotechnic launchers and propane exploders, 3,305 pyrotechnics and cracker shells, and 14 scarecrows and effigies (USDA, MIS 1992 - 1998). In addition to materials provided by WS, pyrotechnics and other hazing tools were purchased and extensively employed by area residents. Herding dogs, alligator effigies, dead goose effigies, kites, electronic devices, and several other methods have also been used in large quantities by area residents, corporations, and municipalities.

Canada geese are protected under the MBTA. Although hunting is allowed during season with the proper licenses and permits, lethal damage control is not permitted without written authorization from the USFWS. Where threats to human health and public safety or where property damage is involved, WS may recommend to the USFWS that a permit be issued to resource owners for lethal control.

In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to property owners and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, laws and regulations, and agency policies.

Recipients of technical assistance receive information from WS or the appropriate regulatory agency regarding legal and responsible methods of control. This includes application procedures as well as biological and environmental impacts of these methods. Recipients of WS technical assistance are responsible for the implementation of recommended control actions. The WS program has no control of the actions, if any, taken by others.

#### *Direct Control:*

Direct control is conducted by WS personnel in the field and typically consists of identification of the source of the problem and implementation of practical control actions. Direct control is usually provided when the resource owner's efforts, such as habitat modification or techniques to frighten geese away are ineffective and technical assistance alone is inadequate. Direct control services provided by WS in Washington are generally provided on a cost-reimbursable basis. This funding is usually provided by resource owners, private businesses, or local, state or federal agencies. WS personnel consider practical methods for resolving damage problems and take action by implementing the most appropriate measures. Direct control services provided by WS

in Washington have included; harassment, wire grid installation, egg addling, nest destruction, capture and relocation, and to a lesser extent, shooting, and capture and euthanasia. Under the Current Program, lethal control is only performed in instances where human health and safety are threatened or negatively affected.

#### *Capture and Euthanasia:*

Geese are captured using the most appropriate and humane method(s). Most captures take place during the molt, allowing groups of birds to be captured efficiently and humanely. During molt, waterfowl are unable to fly due to the shedding (molting) and replacement of their primary and secondary flight feathers. The molting season for resident Canada geese generally occurs in June and July. Captures made at this time of year are specific to resident geese, as defined. Migratory populations of Canada geese have left the area for traditional nesting and breeding areas, primarily in Canada and Alaska. A capture drug, alpha chloralose (AC), is normally the method used to capture geese outside the molt period. AC is regulated by the Food and Drug Administration (FDA). WS is authorized to use AC under the Investigational New Animal Drug Registration (INAD 6602), and WS personnel are trained and certified in its use. AC may not be used 30 days in advance of or during hunting season. Captured geese are euthanized in accordance with guidelines established by the AVMA. In some settings where problem geese cannot be captured or otherwise controlled, a small number may be selectively removed with pellet rifle or shotgun. WS lethally removed a total of 159 resident geese in FY 1997 and 419 in FY 1998 (WS, MIS).

Geese suitable for human consumption are donated to qualified charitable organizations whenever feasible. Geese found to be unsuitable for human consumption and geese taken under circumstances where donations are not feasible are buried or incinerated.

#### *Research and Development:*

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information for the development of biologically sound methods for wildlife damage management. It is active in the research and development of techniques to prevent or resolve damage caused by geese and other waterfowl. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC research was instrumental in the development of methyl anthranilate, the chemical repellent which is now marketed under the names of ReJeX-iT and Bird Shield. In addition, NWRC is currently testing new experimental drugs that inhibit bird reproduction. NWRC scientists have authored hundreds of scientific publications and reports which are respected world-wide for their expertise in wildlife damage management.

## **2.2 Alternative 2: Nonlethal and Technical Assistance Only Alternative**

Alternative 2 would discontinue any lethal direct control of geese by WS, except in emergency situations involving human health and safety. If lethal direct control were used in other situations, it would be employed by persons or programs other than WS. Both nonlethal direct control and technical assistance as described in 2.1 would continue to be provided by WS.

Requests for lethal direct control would be referred to the USFWS. Under the present permitting system, WS frequently assists USFWS by providing site specific recommendations regarding the extent of the problem, potential solution, whether a permit should be issued, and if so how many birds should be removed. Permits could be requested to allow the property owners or resource managers to implement lethal methods themselves or contract others to do so. Permits would be issued by and at the discretion of USFWS.

### **2.3 Alternative 3: Nonlethal Methods First Alternative**

Alternative 3 is similar to the Current Program except that WS personnel would be required to recommend or use nonlethal methods prior to recommending or using lethal methods to control goose damage. Unlike the Current Program, lethal control would not be limited to situations of human health and safety. Both technical assistance and direct control would be provided in the context of a modified IWDM approach. As in Alternative 1, direct control would usually be employed only when requested and funded.

The Current Program recognizes nonlethal methods as an important dimension of IWDM, gives them first consideration in the formulation of each control strategy, and recommends or uses them when practical before recommending or using lethal methods. However, the important distinction between the Nonlethal Methods First Alternative and the Current Program Alternative is that the former alternative would require that all nonlethal methods be recommended or used before any lethal methods are recommended or used.

### **2.4 Alternative 4: Expanded Program Alternative (Proposed Action)**

Alternative 4 is the proposed action. Following the internal, public, and agency response to public involvement, this alternative was added to the list of alternatives being considered for analysis. It is identical to the Current Program Alternative, except that it would not limit the option for lethal control to situations of human health and safety. In accordance with IWDM, this alternative would continue all aspects of the Current Program, but with a greater emphasis on population reduction in specific problem areas where other techniques have proven ineffective. As in Alternative 1, direct control would usually be employed only when requested and funded.

### **2.5 Alternative 5: No Federal Program Alternative**

Alternative 5 would consist of no direct control or technical assistance offered or employed by WS. Under this alternative, wildlife damage conflicts would be handled by private resource owners and managers, private contractors, and/or other government agencies. This alternative is

discussed in detail in the ADC EIS (USDA 1994).

## **2.6 Alternatives Eliminated from Further Consideration**

The following alternative was evaluated and eliminated from further consideration:

The Lethal Methods Only Alternative would have required WS to attempt to eliminate resident Canada geese from the area. This alternative was requested in ten letters received during the public involvement process, but was eliminated as being unrealistic and socially unacceptable. It would not comply with IWDM and would have probable unacceptable environmental impacts on the issues identified.

## **3.0 ENVIRONMENTAL CONSEQUENCES**

### **3.0.1 Method of Analysis**

In the development of this EA, issues concerning biological, economic, sociocultural, and physical impacts were identified by public involvement, interagency consultations, and WS specialists and biologists for evaluation. Each of the alternatives are examined against the following issues.

### **3.0.2 Issues**

The following resident Canada goose management issues were identified as relevant to this process:

1. Humaneness of control methods. Humaneness is a person's perception of the impact of an action on animal pain and suffering, and individuals may perceive the humaneness of an action differently.
2. Possible impact of control methods on non-target, Threatened, and Endangered Species from implementing control methods.
3. Impact on the population of resident Canada geese (target species).
4. Aesthetic value of geese, public viewing opportunities.
5. Effectiveness of control measures in reducing or minimizing damage.

## **3.1 Impact of the Current Program (No Action) Alternative**

### **3.1.1 Humaneness of control methods**

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important and very complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. Some individuals and groups are opposed to some of the management actions of WS. Most animal welfare organizations do not oppose the concept of wildlife damage control. These organizations support restrictions on control methods perceived by them as inhumane, and strongly emphasize use of nonlethal controls. Animal rights advocates oppose killing or harming animals for human gain, because they believe animals have rights equal to or similar to humans (Schmidt 1989, Wywiałowski 1991). Some wildlife biologists maintain that "it is painfully clear that public decisions, prompted by the animal rights movement, are disrupting sound, professional wildlife resource management programs" (Berryman 1987).

Habitat modification, as would be recommended by WS, would be expected to have little or no effect on humaneness. Behavior modification (harassment) could be construed by some as being stressful to geese, as could population management. Description of methods are found in 3.1.5. WS supports the most humane, selective, and effective control techniques and continues to incorporate advances into program activities. WS personnel are also experienced and professional in their use of management methods to minimize pain and suffering.

The issue of humaneness is also discussed and assessed in the ADC EIS (USDA 1994).

### **3.1.2 Possible impact on non-target, Threatened, and Endangered species**

Through consultation with USFWS, it has been determined that there is no effect on Threatened or Endangered species under this alternative (Appendix 4). Most captures take place during the molt which generally occurs in June and July. These seasonal captures harvest only resident geese due to the absence of migratory populations at this time of year. All capture and removal methods allow for positive identification of target species.

Under the Current Program, there has been no impact observed on non-target, Threatened, and Endangered species.

### **3.1.3 Impact on target species**

The Current Program has had little effect on the overall population of resident Canada geese in the Puget Sound area, although the rate of increase in the Lake Washington area appears to have been reduced due to control efforts there. WS transect counts in the Lake Washington area show a 21% population increase from 1992 to 1998. In comparison, during this same period of time, the number of resident geese in the Seattle, Tacoma, and Olympia area increased 143% (fig. 2).

Most efforts made by WS to reduce local goose numbers focused in the greater Seattle / Lake

Washington area. From 1990 through 1995, WS relocated 7,342 geese. As relocations were phased out (see relocation, 3.1.5), WS began to emphasize efforts to prevent reproduction of geese, particularly around Lake Washington. From 1993 through 1998, WS added 6,336 goose eggs. Although the program appeared to be helpful, the number of geese continued to gradually build and problems caused by resident geese continued to worsen throughout this period. In 1997 and 1998, WS turned to lethal control measures in specific areas where human health or safety were threatened or affected, removing a total of 578 geese. Under the Current Program, the population of resident geese in the Puget Sound area would be expected to continue to increase until it reaches the carrying capacity of the environment. Biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animal's health or its environment over an extended period of time (Decker and Purdy 1988). Based on known population rate curves, it is likely that the Puget Sound area is well below its carrying capacity for Canada geese at this time (Savidge 1980) (Kraege, WDFW, pers. comm.)

Overall populations of western Canada geese are currently above the population management objectives set for Washington and Oregon by the USFWS. Based on population and harvest data, the alternatives set forth in this EA would have no significant effect on the population of western Canada geese in Washington (Kraege, WDFW, pers. comm.). Therefore, particularly on a regional basis, little or no overall impact would be expected. Canada goose populations can withstand imposed adult mortality rates of over 40 percent (Allan et al., 1995).

### **3.1.4 Aesthetic value of geese, public viewing opportunities**

Aesthetics is the philosophy dealing with the nature of beauty or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful. The mere knowledge that wildlife exists is a positive benefit to many people (Fulton et al. 1996). Human dimensions of wildlife damage management include identifying how people are affected by problems or conflicts between them and wildlife, attempting to understand people's reactions, and incorporating this information into policy and management decision processes and programs (Decker and Enck 1996, Decker and Chase 1997). Local residents who are experiencing damage may want effective methods to be employed, whereas unaffected parties may not see any need for action. Aesthetically speaking, a passerby may view a large flock of geese with great delight, whereas the property owner may view the same geese with disdain.

Wildlife acceptance capacity is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Wildlife acceptance capacity is also known as the cultural carrying capacity. These terms are important in urban areas, because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the wildlife acceptance capacity. Many people have related how they rejoiced at seeing the first pair of geese on their lakeside property. However, their enthusiasm turned to



disgust as the number of geese soon surpassed their own wildlife acceptance capacity.

Nearly everyone finds some pleasure in viewing wildlife. While some people might measure the aesthetic value of geese simply by their numbers (i.e., more geese = more beauty), other people might find large numbers of geese to be aesthetically displeasing (i.e., more geese = less beauty) because of the problems they cause.

Under the Current Program, the resident goose population in the Puget Sound area would be expected to increase, providing more public viewing opportunities, and a probable divergence on the aesthetic value of geese, as seen by the public.

### **3.1.5 Effectiveness of control measures in reducing or minimizing damage**

The effectiveness of the program can be defined in terms of reduced economic losses, decreased health and safety hazards, and minimized property damage.

#### *Habitat alteration:*

Habitat alteration can be the planting of vegetation unpalatable to wildlife or altering the physical habitat (Conover and Kania 1991). Conover (1991, 1992) found that even hungry Canada geese refused to eat some ground covers such as common periwinkle (*Vinca minor*) and Japanese pachysandra (*Pachysandra terminalis*). Planting less preferred plants or grass species to discourage geese from a specific area will work more effectively if good alternative feeding sites are nearby (Conover 1985). Fences, hedges, shrubs, boulders, etc. can be placed at shore lines to dissuade geese. Restricting a goose's ability to move between water and land will deter geese from an area, especially during the molt (Gosser et al. 1997). WS continues to encourage habitat alteration in the Puget Sound area where feasible. However, people are often reluctant to make appropriate landscape modifications to discourage goose activity (Breault and McKelvey 1991). Unfortunately, both humans and geese appear to find lawn areas near water attractive (Addison and Amernic 1983), and conflicts between humans and geese will likely continue wherever this interface occurs.

#### *Lure crops:*

Lure crops are food resources planted to temporarily attract wildlife away from more valuable resources (i.e. crops). This method is largely ineffective for urban resident Canada geese since food (turf) resources are readily available. For lure crops to be effective, the ability to keep birds from surrounding fields would be necessary, and the number of alternative feeding sites must be minimal (Fairaizl and Pfeifer 1988). No opportunity to utilize lure crops has been presented in the Puget Sound area. Suitable sites and financial resources would have to be procured.

#### *Removal of feeding:*

Artificial feeding by people attracts and sustains more waterfowl in an area than could be supported by natural food supplies. This unnatural food source exacerbates damage by resident geese and should be eliminated. The elimination of feeding of waterfowl is a primary recommendation made by WS, and many local municipalities have adopted ordinances prohibiting it. Some parks have posted signs, and there have been efforts made to educate the public on the negative aspects of feeding waterfowl. However, many people do not comply, and the ordinances are poorly enforced in most areas.

#### *Removal of domestic waterfowl:*

The removal of domestic waterfowl from ponds removes birds that act as “decoys” in attracting Canada geese. Rabenold (1987) and Avery (1994) reported that birds learn to locate food resources by watching behavior of other birds. Domestic and feral geese and ducks and domestic/wild hybrids may also carry disease which threaten wild populations (AAWV undated).

#### *Repellents:*

Methyl anthranilate (MA) is a registered repellent for Canada geese. It is marketed under the trade names ReJeX-iT and Bird Shield. Results with MA appear mixed. Cummings et al. (1995) reported that MA repelled Canada geese from grazing turf for four days. However, Belant et al. (1996) found it ineffective as a grazing repellent when applied at 22.6 and 67.8 kg/ha which is the label rate and triple the label rate, respectively. Moderate to heavy rain or daily watering and/or mowing render MA ineffective. Testing at a Kirkland City Park in 1998 indicated that MA was cost prohibitive and only marginally effective in repelling geese (Johnston, pers. comm.).

Research continues on other avian feeding repellents. A 50% anthraquinone product (Flight Control), shows promise for Canada geese (Dolbeer et al. 1998). Like methyl anthranilate it has low toxicity to birds and mammals. It has an advantage over methyl anthranilate or lime in that it does not have an odor or discolor grass. Further laboratory and field trials are needed to refine minimum repellent levels and to enhance retention of treated vegetation (Sinnott 1998).

#### *Hazing:*

Hazing reduces losses in those instances when the affected geese move to a more acceptable area. Achieving that end has become more difficult as the local population of geese has increased. Geese hazed from one area where they are causing damage, frequently move to another area where they cause damage (Brough 1969, Conover 1984, Summers 1985, Swift 1998). Smith et al. (1999) noted that other biologists have reported similar results, stating: “...biologists are finding that some techniques (e.g., habitat modifications or scare devices) that were effective for low to moderate population levels tend to fail as flock sizes increase and geese become more accustomed to human activity”. Generally speaking, birds tend to habituate to hazing techniques (Zucchi and Bergman 1975, Blokpoel 1976, Ruger 1985, Summers 1985, Aubin 1990).

### *Scarecrows:*

The use of scarecrows has had mixed results. Effigies depicting alligators, eagles and dead geese have been employed with limited success in small areas for short periods by WS. WS personnel also reported positive results with the use of mute swan decoys in some locations. An integrated approach (swan and predator effigies, distress calls and nonlethal chemical repellents) was found to be ineffective at scaring or repelling nuisance Canada geese (Conover and Chasko 1985). In general, scarecrows are most effective when they are moved frequently, alternated with other methods, and are well maintained. However, scarecrows tend to lose effectiveness over time and become less effective as goose populations increase (Smith et al. 1999).

### *Distress calls:*

Aguilera et al. (1991) found distress calls ineffective in causing migratory and resident geese to abandon a pond. Although, Mott and Timbrook (1988) reported distress calls as effective at repelling resident Canada geese 100 meters from the distress unit, the geese would return shortly after the calls stopped. The repellency effect was enhanced when pyrotechnics were used with the distress calls. Distress calls for Canada geese are not currently available, and due to the level of volume required, their use in most urban or suburban areas would be prohibited by local noise ordinances. A similar device which electronically generates sound, has proven ineffective at repelling migrant Canada geese (Heinrich and Craven 1990).

### *Pyrotechnics:*

Pyrotechnics (screamer shells, bird bombs, and 12-gauge cracker shells) have been used to repel many species of birds (Booth 1994). Aguilera et al. (1991) found 15mm screamer shells effective at reducing resident and migrant Canada geese use in areas of Colorado. However, Mott and Timbrook (1988) doubted the efficacy of harassment and believed that moving the geese simply redistributed the problem to other areas of the city/lake.

Fairaizl (1992) and Conomy et al. (1998) found the effectiveness of pyrotechnics highly variable among different flocks of Canada geese. Some flocks in urban areas required continuous day-long harassment with frequent discharges of pyrotechnics. The geese usually returned within hours. A minority of resident Canada goose flocks in Virginia showed no response to pyrotechnics (Fairaizl 1992). Some flocks of Canada geese in Virginia have shown quick response to pyrotechnics during winter months suggesting migrant geese made up some or all of the flock (Fairaizl 1992). Shultz et al. (1988) reported fidelity of resident Canada geese to feeding and loafing areas is strong, even when heavy hunting pressure is ongoing. Mott and Timbrook (1988) concluded that the efficacy of harassment with pyrotechnics is partially dependent on availability of alternative loafing and feeding areas.

Although one of the more effective methods of frightening geese away, more often than not

pyrotechnics simply move geese to other problem areas. There are also safety and legal implications regarding their use. Discharge of pyrotechnics is inappropriate and prohibited in some urban/suburban areas. Pyrotechnic projectiles can start fires, ricochet off buildings, pose traffic hazards, cause some dogs to bark incessantly, and injure and annoy people. Public involvement identified pyrotechnics as having caused fear or alarm in urban/suburban areas as the sound of discharge sometimes resembles gunfire. Some Puget Sound area residents were forced to discontinue their use of pyrotechnics because of local ordinances and complaints by neighbors (public involvement).

#### *Propane cannons:*

Propane cannons are generally inappropriate for urban/suburban areas due to the repeated loud explosions which many people would consider a serious and unacceptable nuisance. Although propane cannons can be an effective dispersal tool for migrant geese, particularly in agricultural settings, resident urban geese are more tolerant of noise and habituate to propane cannons in a relatively short period of time.

#### *Visual Deterrents:*

Reflective tape has been used successfully to repel some bird species from crops when spaced at 3 or 5 meter intervals (Bruggers et al. 1986, Dolbeer et al. 1986). Other studies have shown reflective tape ineffective (Tobin et al. 1988, Bruggers et al. 1986, Dolbeer et al. 1986, Conover and Dolbeer 1989). While sometimes effective for short periods of time, reflective tape has proven mostly ineffective in deterring local resident geese (public involvement).

Mason et al. (1993) and Mason and Clark (1994) have shown white and black plastic flags are effective at repelling snow geese from pastures when alternative grazing areas were available. Mylar flagging has been reported effective at reducing migrant Canada goose damage to crops (Heinrick and Craven 1990). However, flagging has proven generally ineffective in discouraging resident geese from properties in the Puget Sound area. Flagging is impractical in many locations and has met with some local resistance due to the negative aesthetic appearance presented on the properties where it is used.

#### *Mute swans:*

Mute swans are ineffective at preventing Canada geese from using or nesting on ponds (Conover and Kania 1994). Additionally, swans can be aggressive towards humans (Conover and Kania 1994, Chasko 1986) and may have undesirable effects on native aquatic vegetation (Allin et al. 1987, Chasko 1986). Furthermore, Executive Order 11987 May 24, 1977, states that federal agencies shall encourage states, local governments, and private citizens to prevent the introduction of exotic species into the environment. Mute swans are classified as a deleterious exotic species, and it is a violation of state regulations to possess or release mute swans in Washington.

### *Dogs:*

Dogs were used at Kirkland City Park during the summer of 1998 and were effective in reducing the number of geese using the park through the summer. Dogs can be effective at harassing geese and keeping them off turf and beaches (Conover and Chasko 1985). Around water, this technique appears most effective when the body of water to be patrolled is less than two acres in size (Swift 1998). Although dogs can be effective in keeping geese off individual properties, they do not contribute to a solution for the larger problem of overabundant goose populations (Castelli and Sleggs 1998). As with other harassment techniques, when harassment with dogs ceases, the number of geese returns to pre-treatment numbers (Swift 1998). WS has recommended and encouraged the use of dogs where appropriate and has contracted the use of trained dogs at one location.

### *Relocation:*

The relocation of resident geese from the Puget Sound area has had mixed success. Local populations of damaging geese were reduced and damage was decreased at specific problem sites. However, Canada geese have strong homing instincts, and some of the adult birds returned to nest again (WS banding records). Generally speaking, relocation attempts are not always successful. Cooper and Keefe (1997) found 42 - 80% of adult Canada geese relocated from Minnesota to Oklahoma returned to the capture area. Also, Fairaizl (1992) found 19% of juveniles relocated within Nevada returned to the capture area. In Puget Sound, most geese were successfully relocated as was evidenced by the numbers harvested by hunters near their relocation sites (WS banding records).

One of the biggest problems experienced in the state of Washington with relocations was that some of the geese relocated from Lake Washington found their way to other cities leading to goose problems where none previously existed (WS banding records).

Relocation of resident geese has the potential to spread disease into populations of migrating waterfowl. The American Association of Wildlife Veterinarians (undated) "...discourages the practice of relocating nuisance or excess urban ducks, geese and swans to other parks or wildlife areas as a means of local population control." Relocation was phased out of the Current Program as a viable method of control, because of the potential for the spread of disease and the probability of establishing populations of problem geese elsewhere.

### *Contraceptives:*

Contraceptives have not proven to be an effective method for reducing damage, and there are no contraceptive drugs registered with the Food and Drug Administration for use in Canada geese. Although, Canada geese have been successfully vasectomized to reduce recruitment into future populations, this method is effective only if the male remains mated and it only affects reproduction from one female. Additionally, the ability to identify breeding pairs for isolation

and to capture a male goose for vasectomization becomes increasingly difficult as the number of geese increase (Converse and Kennelly 1994). Canada geese have a long life span once they survive their first year (Cramp and Simmons 1977, Allan et al. 1995). Leg-band recovery data indicate that some geese live longer than 20 years. The sterilization of resident Canada geese would not reduce the damage caused by the overabundance of the goose population since the population of Canada geese would remain relatively stable.

#### *Egg addling:*

Egg addling, oiling, freezing, or puncturing can be effective in reducing recruitment into the local population (Christens et al. 1995, Cummings et al. 1997). Approximately five eggs must be removed to have the effect of stopping one adult from joining the breeding population (Rockwell et al. 1997, Schmutz et al. 1997). Egg addling, while a valuable tool, has fallen short as a single method for reducing local goose populations in the Puget Sound area. Many nests cannot be found by control agents in typical urban settings due to the difficulties in gaining access to search the hundreds of private properties where nests may occur. In addition, geese which have eggs oiled in successive years may learn to nest away from the water making it more difficult to find nests. As round-ups and relocations were replaced with egg addling (less population management), property losses, health and safety threats, and complaints have increased (USDA, MIS 1993 - 1998).

#### *Toxicants:*

Toxic pesticides are regulated by the Environmental Protection Agency (EPA). There are currently no toxic pesticides registered with the EPA for use on Canada geese.

#### *Hunting and special-purpose kill permits:*

WS sometimes recommends that resource owners consider legal hunting as an option for controlling goose damage. Although legal hunting is impractical and/or prohibited in most urban/suburban areas, it can be used to reduce some populations of resident Canada geese, especially in rural areas. Legal hunting also reinforces harassment programs (Kadlec 1968). In response to growing problems caused by resident Canada geese in the Puget Sound area, the WDFW is investigating the possibility of further expanding some local hunting seasons. A special September goose season was initiated in all of western Washington in 1997 to target resident Canada geese. October through January season lengths and daily bag limits were increased almost 10 years ago in the Puget Sound area. Additional season days are not allowed under the MBTA.

Special-purpose kill permits can be highly effective in removing birds from specific areas and in supplementing harassment. These permits are granted by the USFWS to specific individuals for the purpose of reducing conflicts caused by Canada geese, other waterfowl, and migratory birds. WS sometimes recommends to the USFWS that kill permits be issued to specific property

owners, particularly when human health or safety is jeopardized.

#### *Lethal Control by WS:*

The most efficient way to reduce the size of an urban flock is to increase mortality among adult geese. Nationwide, hunting is the major cause of goose losses, but geese may seldom be available to hunters in an urban environment (Conover and Chasko 1985, Smith et al. 1999). For purposes of lethal control, resident geese are usually captured by drive trapping, in which a group of flightless geese is herded into a net (Pakulak and Schmidt 1970). Drive trapping is used to catch adult geese during their molting period in early summer, as well as juveniles before they have gained the ability to fly. Captured geese are euthanized following methods recommended by the AVMA. In some settings where problem geese cannot be captured or otherwise controlled, a small number may be selectively removed with pellet rifle or shotgun. The advantages of lethal control by WS are that it may be applied directly to the problem population, its effects are obvious and immediate, and it carries no risk that the geese will return or move and create conflicts elsewhere. The primary disadvantage is that it is sometimes more socially controversial than other techniques.

The use of lethal methods to reduce Canada goose damage can be very effective at alleviating damage and the most economical approach to reducing damage when compared to nonlethal methods (Cooper and Keefe 1997). Additionally, capture and euthanasia of Canada geese is the most cost effective lethal method to reduce damage, except for hunting (Cooper and Keefe 1997). Moreover, the use of lethal methods has longer effectiveness than nonlethal methods because it would take months to years before the original local population level of Canada geese returned. Lethal methods would also reduce conflict among resource owners whereas nonlethal actions only move the Canada geese among resource owners (i.e., spread the damage) (Cooper and Keefe 1997, Smith et al. 1999), and possibly leave resource owners with the least financial means burdened with the Canada geese and the damage.

#### Overall effectiveness:

The “modified” IWDM approach combining several techniques applied under the Current Program has been in place for several years. Biologists are finding that some techniques that were effective for low to moderate population levels tend to fail as flock sizes increase and geese become more accustomed to human activity (Smith et al. 1999). The Current Program, while somewhat effective, has failed to adequately reduce economic losses, health and safety hazards, and property damage. The documented loss of effectiveness over the last few years appears to be due to the insufficient removal of geese from problem areas. Long-term solutions usually require some form of local population management to stabilize or reduce goose numbers (Smith et al. 1999).

### **3.2 Impact of Nonlethal and Technical Assistance only Alternative**

### **3.2.1 Humaneness of control methods**

The Technical Assistance Alternative is a modification of the Current Program Alternative. No direct control would be provided by WS, except in emergency situations involving human health and safety. WS would provide technical assistance consisting of recommendations and some training. Although many techniques may be applicable, the individual requesting assistance would determine which recommendations to carry out. The direct control methods may be applied by people with little or no experience or knowledge in wildlife management. Therefore, although the recommended methods may be humane, the humaneness of their application may not be. This alternative may be less humane than the Current Program Alternative.

### **3.2.2 Possible impact on non-target, Threatened, and Endangered Species**

The impact of Alternative 2 may be similar to 3.1.2. However, WS would not be involved and the possible impact of others is unknown. Individuals implementing control methods may pose a greater possibility of affecting non-target, Threatened, and Endangered species.

### **3.2.3 Impact on target species**

It would be expected that the impact on local Canada goose populations would be low compared to the Current Program Alternative, since this alternative would reduce direct control actions by WS. However, legal hunting and special-purpose kill permits would continue to be available to the public. It is likely that less lethal action would be authorized by USFWS under this alternative and that local Canada goose populations would be expected to increase dramatically.

### **3.2.4 Aesthetic value of geese, public viewing opportunities**

Under this alternative, the population of resident Canada geese would be expected to increase rapidly until the carrying capacity of the environment was met. Some individuals or groups may consider a large increase in resident geese aesthetically pleasing. People experiencing goose damage would most likely find a large increase aesthetically displeasing. Public viewing opportunities would increase over that of the Current Program Alternative. An increased negative aesthetic impact from excess goose feces in residential and public areas would be expected. Analysis of aesthetics would be similar to those discussed under the Current Program Alternative (3.1.4).

### **3.2.5 Effectiveness of control measures in reducing or minimizing damage**

As discussed under Section 3.1.5, methods of frightening or discouraging geese have been effective at specific sites. In most instances, these methods have simply shifted the problem elsewhere. Habitat modifications, while potentially effective are poorly accepted and not widely employed. Many habitat modifications lose effectiveness as goose numbers increase. Population reduction would be limited to opportunities for legal hunting and special-purpose kill permits.



The effectiveness of control measures under this alternative would be low compared to the Current Program Alternative, because most lethal methods would be disallowed (Smith et al. 1999).

### **3.3 Impact of the Nonlethal Methods First Alternative**

#### **3.3.1 Humaneness of control methods**

While the humaneness of the nonlethal control methods under this alternative would be comparable to the Current Program Alternative (3.1.1), the extra harassment caused by the required use of methods that may be ineffective could be considered less humane. In addition, due to the rapid growth of the local population, delaying the use of lethal methods may eventually result in a larger number of geese be removed (Manuwal 1989). Killing more geese would be considered less humane by some people.

#### **3.3.2 Possible impact on non-target, Threatened, and Endangered Species**

Impacts on non-target, Threatened, and Endangered Species would be similar to the Current Program Alternative (3.1.2).

#### **3.3.3 Impact on target species**

In some locations where goose damage has been historically severe, there is documentation to show that most of the nonlethal methods that could be practically employed have either been tried or are currently being used. Lethal control could be implemented almost immediately in such locations under this, the Nonlethal Methods First Alternative. However, in most locations, documentation of nonlethal control efforts would be needed before lethal removal of geese could occur. This process could take from one to several years, depending on the variables at each site. The nonlethal methods used under this alternative would be identical to those used and recommended in the Current Program and would be expected to be similarly effective (i.e., goose damage would be reduced in some locations and not in others). Goose concentrations would continue to grow in areas where nonlethal methods proved ineffective, and eventually lethal control would be required at those locations.

Although lethal control would be conducted during the first year at a few sites, most lethal control would occur from one to several years later. During this time, goose numbers would be expected to increase at a rate between 11 - 24 percent per year (Ettl 1993). As the local goose population increases, the number of areas negatively affected by geese would increase, and greater numbers of geese would be expected to congregate at sites where nonlethal management efforts were not effective. Lethal control would commence at these sites once all nonlethal management options were exhausted. Because the number of geese congregating in problem areas would continue to grow for several years under this option, this alternative would result in a substantially greater number of geese being killed annually, and in total, than if lethal control

were immediately implemented at problem areas. As compared with the Current Program, the population of geese in the Puget Sound area would increase at a slightly greater rate during the first several years, and may continue to increase at a greater rate depending on the intensity of lethal management occurring later in the program. There would be no significant effect on the overall population of western Canada geese occurring in Washington.

#### **3.3.4 Aesthetic value of geese, public viewing opportunities.**

As compared to the Current Program Alternative, there would be an increase in resident geese until the lag time described in (3.3.3) above elapses, followed by a possible decrease. Some people would consider further increases aesthetically pleasing; others would find increases aesthetically displeasing. The same would hold true for decreases in resident goose populations.

If goose numbers were reduced the negative aesthetic impacts of excess goose feces in residential and public areas would be expected to improve.

#### **3.3.5 Effectiveness of control measures in reducing or minimizing damage**

Initially, the effectiveness of this alternative would be similar to the Current Program, because it incorporates all aspects of the Current Program with the added option for increased lethal control if nonlethal measures don't work. The Current Program uses lethal control sparingly, and only in instances where human health and safety are threatened. This alternative requires that all nonlethal methods must be exhausted at each damage location before lethal control is used. There is no human health and safety restriction on lethal control under this alternative.

Based on the known effectiveness of available nonlethal methods (section 3.1.5), it is reasonable to expect that not all damage situations would be adequately resolved nonlethally. As a result, lethal control would be implemented in locations where goose problems persisted. It would take approximately 1 - 2 years to exhaust nonlethal methods at most damage locations, and Canada goose populations in the Puget Sound area would be expected to continue to grow at a rate of 11 - 24 percent (Ettl 1993) for the first 2 years of this alternative (section 3.3.3). The amount of goose damage at existing locations, as well as the number of new areas negatively impacted by geese, would also be expected to increase proportionally during this time. Once lethal measures were implemented, goose damage would be expected to drop relative to the reduction in localized populations of damaging geese. If localized populations were reduced, the effectiveness of nonlethal methods could be expected to return to previous levels at those sites. Further lethal actions would also become more effective and efficient as the number of damaging geese was reduced, which would possibly decrease, but not eliminate, future needs for lethal control.

After a period of several years, the effectiveness of this alternative may surpass that of the Current Program, because of the increased option for lethal control. However, such a delay in implementing lethal control would result in an overall increase in goose damage during the first

several years. In addition, the delay would result in localized populations of damaging geese continuing to grow, making their populations even more difficult to control later. This would reduce the ultimate effectiveness of lethal control which is better implemented early in the population growth curve. It would also result in a larger number of geese being killed to achieve the same outcome as if lethal control had been implemented earlier.

### **3.4 Impact of Expanded Program Alternative (Proposed Program)**

#### **3.4.1 Humaneness of control methods**

The humaneness of the control methods used under this alternative would be identical to the Current Program (3.1.1). However, the proportion of lethal methods would be increased, resulting in more geese being killed than in the Current Program and fewer geese being killed than in Alternative 3. Some people may view this alternative as being less humane than the Current Program.

#### **3.4.2 Possible impact on non-target, Threatened, and Endangered Species**

Impacts on non-target, Threatened, and Endangered Species would be similar to the Current Program Alternative (3.1.2).

#### **3.4.3 Impact on target species**

Under this alternative, WS would possibly remove up to 3,500 geese from the 12-county area surrounding Puget Sound (Figure 1) in the first year. Direct lethal control would only be provided following a request for service, the use of the WS Decision Model (Appendix 3) to determine whether lethal control was necessary, and funding from the cooperator to conduct the project. The number of geese taken after the first year would be expected to drop as geese are removed from problem areas and requests for assistance begin to subside. Consistent with IWDM practices, all methods including egg addling would be considered and used where deemed appropriate.

It would be expected under this alternative that local concentrations of geese would be reduced in control areas. The growth rate of the population of western Canada geese in the Puget Sound area may also be reduced as a result of the proposed actions. Overall populations of western Canada geese are currently above the population management objectives set for Washington and Oregon by the USFWS. Based on population and harvest data, there would be no significant effect on the population of western Canada geese in Washington from any of the alternatives set forth in this EA, including this, the Expanded Program Alternative (Kraege, pers. com.). The number of geese removed would be reevaluated annually to ensure that population levels continue to fall within management objectives set by the USFWS.

#### **3.4.4 Aesthetic value of geese, public viewing opportunities**

The analysis of aesthetics would be similar to those discussed under the Current Program Alternative (3.1.4). However, there may be a small to moderate decrease in numbers of resident Canada geese in the Puget Sound area under this alternative, and larger reductions may be evident at specific locations where geese are removed. Although goose numbers may be reduced at specific sites, Canada geese will continue to be a common sight in the Puget Sound area. The potential for negative aesthetic impacts from excessive goose feces in residential and public areas would be expected to decrease under this alternative.

#### **3.4.5 Effectiveness of control measures in reducing or minimizing damage**

This alternative would be more effective than the Current Program or any of the other alternatives in reducing or minimizing damage caused by geese. It incorporates all aspects of the Current Program, but allows for greater flexibility to use lethal control of geese in problem areas where, in the opinion of professionals, nonlethal methods would not resolve the damage.

Alternative 1, the Current Program, voluntarily restricts the use of lethal control to instances where human health or safety is impacted. However, in response to public involvement, Alternative 4 would give WS the option to implement lethal control in response to damage to property and other resources. This Alternative would enhance WS's ability to resolve a broader range of damage problems. Repopulation of sites where lethal control methods were used would undoubtedly take place as long as suitable habitat existed in that area. However, the use of lethal control would reduce the number of damaging geese thereby enhancing the use of follow-up nonlethal control methods (Smith et al. 1999). Although the repeated use of lethal control methods would eventually be required in areas where habitat alteration was not employed, the frequency of such actions and number of geese taken would be reduced over time.

Alternative 4 would also be more effective than Alternative 2 which relies primarily on frightening or displacing geese from one damaging situation to another. It would be more effective than Alternative 3, in that lethal control could be implemented without delay if deemed necessary and appropriate in the best professional judgement of WS biologists. In such situations, immediate implementation of lethal control would offer more effective resolution to problems than the delayed implementation offered under Alternative 3 and would result in fewer geese being killed by WS.

### **3.5 Impact of No Federal Program Alternative**

#### **3.5.1 Humaneness of Control Methods**

The No Federal Program Alternative would result in no impact by WS. The impact of others would be unknown. (see 3.6)

#### **3.5.2 Possible impact on non-target, Threatened, and Endangered Species**

This Alternative would result in no impact by WS. The impact of others would be unknown but may be greater than the Current Program (3.1.2). (See 3.6).

### **3.5.3 Impact on target species**

It would be expected that the impact on local Canada goose populations would be low compared to the Current Program Alternative, since this alternative would eliminate both direct control and technical assistance by WS. However, legal hunting and special-purpose kill permits would continue to be available to the public. It is likely that less lethal action would be authorized by USFWS under this alternative and that local Canada goose populations would be expected to increase dramatically. (See 3.6)

### **3.5.4 Aesthetic value of geese, public viewing opportunities.**

Under this alternative, the population of resident Canada geese would be expected to increase rapidly until the carrying capacity of the environment was met. (See 3.1.4 and 3.2.4) Some people would consider further increases aesthetically pleasing; others would find increases aesthetically displeasing.

### **3.5.5 Effectiveness of control measures in reducing or minimizing damage.**

Taking no action could reasonably be expected to be the least effective of all of the alternatives examined in this EA.

## **Table 1. Summary of Environmental Consequences**

2.0 Alternatives 3.0.2 Issues	2.1 Alternative 1 (Current)	2.2 Alternative 2 (Nonlethal)	2.3 Alternative 3 (Nonlethal First)	2.4 Alternative 4 (Expanded)	2.5 Alternative 5 (No Federal Program)
Humaneness of control methods.	3.1.1 Subjective, employs most humane methods available. Involves some lethal control.	3.2.1 No lethal control by WS. Impact of others unknown.	3.3.1 Subjective, employs most humane methods available. Potentially involves the most lethal control of all alternatives.	3.4.1 Subjective, employs most humane methods available. Involves more lethal control than Alternative 1 and most likely less than Alternative 3.	3.5.1 No impact by WS. Impact of others unknown.
Possible impact on non-target, Threatened, and Endangered Species.	3.1.2 No significant impact observed.	3.2.2 No impact by WS. Impact of others unknown but likely to be greater.	3.3.2 No significant impact would be expected.	3.4.2 No significant impact would be expected.	3.5.2 No impact by WS. Impact of others unknown but likely to be greater.
Impact on target species.	3.1.3 Continued increase in resident goose population. May lead to increase in statewide population.	3.2.3 No impact by WS. Low impact by others. Resident goose populations would be expected to increase dramatically. May lead to increase in statewide population.	3.3.3 Initial increase in resident goose population would be expected, followed by increased need for lethal control. Little impact on statewide population.	3.4.3 Local numbers may be reduced. Continued growth of the resident goose population in the Puget Sound area may be slowed, delayed, or halted. Little impact on statewide population.	3.5.3 No impact by WS. Low impact by others. Resident goose populations would be expected to increase dramatically. May lead to increase in statewide population.
Aesthetic value of geese, public viewing opportunities.	3.1.4 Aesthetic value subjective. Increasing goose population would be aesthetically pleasing to some people and displeasing to others. Ample viewing opportunities.	3.2.4 Aesthetic value subjective. Increasing goose population would be aesthetically pleasing to some people and displeasing to others. Ample viewing opportunities.	3.3.4 Aesthetic value subjective. Increasing goose population followed by decrease. Ample viewing opportunities.	3.4.4 Aesthetic value subjective. Fewer problems with geese would increase their aesthetic appeal for many people. There would continue to be ample viewing opportunities.	3.5.4 Aesthetic value subjective. Increasing goose population would be aesthetically pleasing to some people and displeasing to others. Ample viewing opportunities.
Effectiveness of control measures in reducing or minimizing damage.	3.1.5 Effectiveness is decreasing.	3.2.5 Would likely be ineffective.	3.3.5 Initially it would be expected to be less effective than Current Program, followed by increased effectiveness.	3.4.5 Would likely be the most effective alternative.	3.5.5 Would likely be the least effective alternative.

### 3.6 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions.

Cumulative impacts of public actions to control resident Canada geese in the absence (3.5) or reduced (3.2) presence of WS can only be speculated upon. However, it is reasonable to expect that as governmental assistance in resolving wildlife conflicts decreases, independent actions increase. The environmental desirability of these actions would be dependent upon the individuals who implement them. Many such actions would be poorly monitored, and public accountability would likely be low. For these reasons, cumulative impacts to the environment

may be expected to increase as WS assistance decreases.

The scope of this proposal and the number of resident Canada Geese that might be removed by WS under any of the alternatives would result in no significant cumulative direct or indirect impacts. WS maintains ongoing contact with USFWS and submits annual migratory bird activity reports. The USFWS monitors the total take of Canada geese from all sources and factors in survival rates from predation, disease, etc. Ongoing contact with USFWS, WDFW and local wildlife management agencies, assures local, state and regional knowledge of wildlife population trends. WS would have no significant cumulative impact on non-target species, or sensitive and protected species. This finding is also made on a national level in the ADC programmatic EIS (USDA 1994).

This EA will be reviewed periodically to assure conformance with current environmental regulations and project scope. Substantial changes in the project scope or changes in environmental regulations may trigger the requirement for a new or revised EA.

*Western Canada goose management objectives for Puget Sound area:*

Population indices are often used by wildlife management agencies to trigger specific management actions. Population indices, rather than population estimates, are frequently utilized for trend analysis when surveys of the entire population are impractical or expensive. In the case of Canada geese in the Puget Sound region, an index has been developed by WDFW considering specific rural, suburban, and urban areas, but does not include all breeding habitat. This index is likely to represent 25 - 35% of the total breeding population in the Puget Sound region.

Data collected for the 12 counties indicate an average of 5,270 geese in the surveyed areas. These represent actual goose counts from a portion of the area and are well below the true population. Waterfowl managers have set objective levels using survey results as an index rather than a total population estimate. An optimal index at 2,000 (3 year-average) and a minimum threshold index at 1,000 (3-year average) were set. These indexes are calculated annually, and if the minimum threshold index were ever reached, WS would cease lethal operations and reexamine objectives.

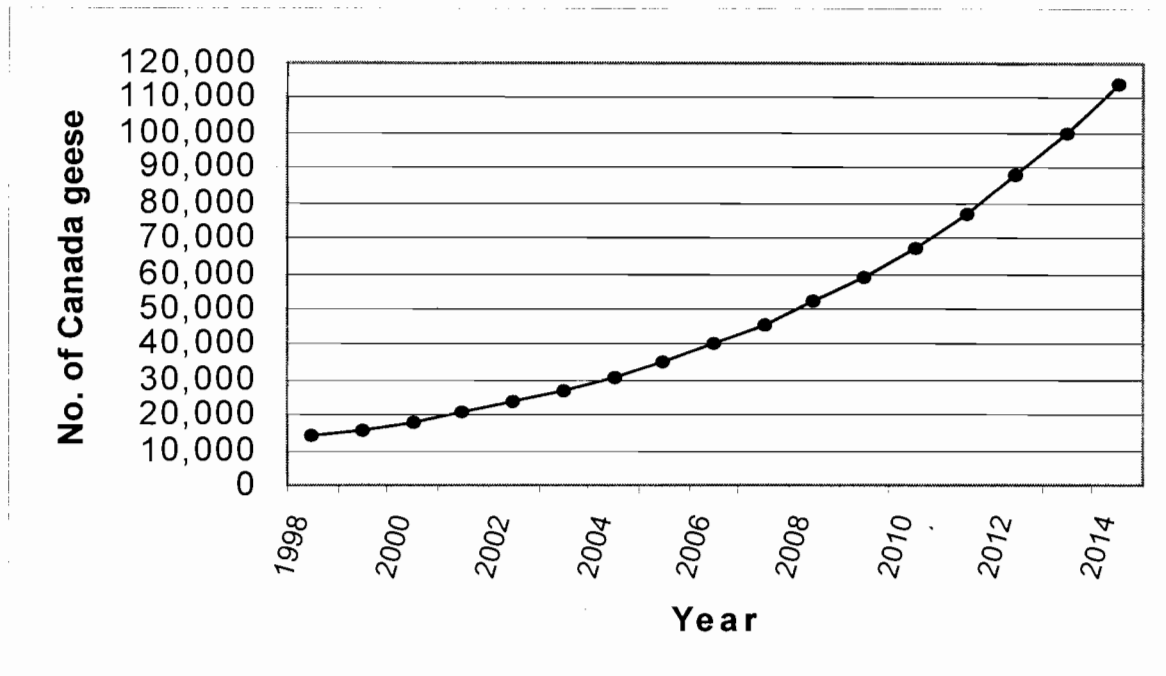


Figure 3. Projected Canada goose population growth for the Seattle area based on a 14% intrinsic growth rate ( $r$ ). Ettle (1993) determined the growth rate for Seattle using population estimates from 1964 - 1988. This illustration depicts projected goose populations under the Current Program (Alternative 1). Starting point from 1998 Audubon Society Field Notes and American Birds.

USFWS and WDFW waterfowl managers concur that the removal of 3,500 geese by WS from the Puget Sound area in 1999 would result in no significant impact on Puget Sound, the state of Washington, or Pacific Flyway Canada goose populations. WS activities will be monitored and reported to WDFW and USFWS and index objectives will be recalculated on an ongoing basis.

*Western Canada goose management objectives for Unit IV:*

Washington State is included in Unit IV of the Pacific Flyway Management Plan for the Pacific Population of Western Canada Geese. The breeding pair index for this unit has increased from 1,926 in 1970 to 4,040 in 1998, but the index has not included the Puget Sound area. Therefore the Unit IV breeding pair indices have likely been weighted toward the conservative for the last few years. Hunting seasons have been expanded in recent years to provide recreational opportunity and control local goose populations, but the unit index is still well above management objectives of between 2,000 - 3,000.



## 4.0 CONCLUSION

It should be noted that the western Canada goose was not historically found in the Puget Sound area. It was mans' intervention that accelerated their introduction, and it was mans' altering of the environment that provided suitable habitat for goose populations to grow and flourish. The introduction of geese was a well-meaning action by government officials intended to help the species and provide enjoyment for people. The altering of the environment from a forested type to a more open and grassy type was a result of urbanization and man's own preference for open space. It is unlikely and unreasonable to expect that the habitat in the Puget Sound area will be returned to mostly wooded shorelines, and it would be difficult and socially unacceptable to remove all the geese. Therefore, the implementation of a well-rounded management alternative is essential in providing reasonable resolution to the problems presented by resident geese.

The implementation and application of a variety of safe and practical methods for the prevention and control of damage caused by wildlife is the most effective solution addressing the needs for action presented in this EA. The Current Program, Nonlethal First and the Proposed Program Alternatives draw from a combination of wildlife damage management techniques with little or no impact on non-target, sensitive, or protected species. However, the Current Program and Nonlethal First Alternatives suppress the use of some methods necessary to effectively control damage. The Nonlethal Alternative would be expected to be ineffective and would fail to adequately meet WS's legal authority to provide wildlife damage management assistance. Under the Proposed Program Alternative, WS would apply both lethal and nonlethal methods, separately or in combination. Nonlethal methods may incorporate habitat modification, modification of animal behavior (i.e., hazing, exclusion devices, etc.), modification of human behavior (eliminate supplemental feeding), or any combination of these, depending on the characteristics of the specific damage problems. The proposed program offers greater flexibility in implementing lethal control, and for this reason, would be more effective in reducing economic losses and human health and safety concerns than any of the other alternatives. If less effective control methods were to be adopted, an increase in unlawful, less humane, and environmentally damaging methods could be expected to increase, as damaged parties become frustrated with the problems.

Under all of the alternatives, control methods would usually be employed by WS only when and where requested and funded. In all instances the WS Decision Model (Appendix 3) would be used to determine which methods should be implemented to best address issues and resolve problems. Under the Decision Model, the magnitude, geographic extent, frequency, and duration of the problem would be used to determine if action was warranted.

There are both obvious and documented links between the number of geese in an area and the amount of damage incurred. Due to the relationship between populations and damage, references to them are made almost interchangeably in this EA. A large part of the mission of WS is to control wildlife damage, which sometimes requires reductions of local populations. Because the central problem is related to an overabundance of geese, an effective management plan must include methods of population control (Ettle 1993). The authority to manage waterfowl

populations in the state of Washington is vested in the USFWS and WDFW. Any control methods used by WS that may impact overall waterfowl populations are conducted in coordination with and reported to these consulting agencies. The interaction with the USFWS and WDFW would assure that there would be no significant impact caused by WS actions under the Proposed Program.

The Proposed Program Alternative best responds to the legal authority of WS to provide wildlife damage management assistance. This alternative uses legally, environmentally, biologically, and technically sound management strategies and has the least likely potential for harmful direct and indirect impacts on the environment.

## 5.0 PREPARERS, REVIEWERS AND PERSONS CONSULTED

### 5.1 Preparers

Price, Keel - WS, Wildlife Biologist - **Primary Writer**  
Starratt, Shannon - WS, Environmental Coordinator - **Editor**  
Woodruff, Roger - WS, Assistant State Director - **Writer / Editor**

### 5.2 Reviewers and Persons Consulted

Bortner, Brad - USFWS, Region 1 Migratory Bird Coordinator  
Carrel, Sean - WDFW, Customer Service Representative  
Dunlap, Brett - WS, District Supervisor  
Frodge, Jonathan - King County DNR, Water Quality Planner  
Gloman, Nancy - USFWS, Acting Field Supervisor  
Goodman, Fred - WS, Specialist  
Harris, Donald - Seattle Parks and Recreation, Director  
Houben, John - WS, District Supervisor  
Kraege, Don - WDFW, Section Waterfowl Manager  
Laumeyer, Philip - USFWS, Field Supervisor  
Linnell, Mike - WS, Wildlife Biologist  
May, Jerry - WS, Specialist  
McAllister, Kelly - WDFW, District Biologist  
Michaels, James - USFWS, Supervisory Wildlife Biologist for Endangered Species  
Moore, Allen - WDOE, Environmental Specialist  
Oldenburg, Gary - WS, State Director  
Rideout, Dave - WS, Specialist  
Swartout, Mark - Thurston County Dept. of Water & Waste Mgt., Natural Res. Specialist  
Wadleigh, Richard - WS, National Environmental Manager  
Young, Jeff - WS, Wildlife Biologist

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## APPENDIX 1

### Authority of Federal and State Agencies in wildlife damage management in Washington

#### Wildlife Services Legislative Authority

The primary statutory authority for the Wildlife Services program is the Animal Damage Control Act of 1931, which provides that:

*“The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions.”*

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing “bringing (damage) under control”, rather than “eradication” and “suppression” of wildlife populations. In 1988, Congress strengthened the legislative authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

*“That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.”*

#### U.S. Department of Interior, Fish and Wildlife Service Legislative Authority

The Fish and Wildlife Service’s (FWS) authority for action is based on the Migratory Bird Treaty Act of 1918 (as amended), which implements treaties with Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

“From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President”.

The authority of the Secretary of Agriculture with respect to the Migratory Bird Treaty was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

### **WDFW Legislative Authority**

The Department’s authority for managing wildlife in the State of Washington is based on Washington State Chapter 77.12 RCW.

RCW 77.12.240 Authority to take wildlife - Disposition. The director may authorize the removal or killing of wildlife that is destroying or injuring property, or when it is necessary for wildlife management or research.

The director or other employees of the department shall dispose of wildlife taken or possessed by them under this title in the manner determined by the director to be in the best interest of the state. Proceeds from sales shall be deposited in the state treasury to be credited to the state wildlife fund. [1980 c 197 § 1; 1987 c 506 § 33; 1980 c 78 § 41; 1955 c 36 § 77.12.240. Prior: 1947 c 275 § 33; Rem. Supp. 1947 § 5992-43.]

Legislative findings and intent - 1987 c506: See note following RCW 77.04.020.

Effective date - Intent, construction - Savings - Severability - 1980 c 78: See notes following RCW 77.04.010.

## **APPENDIX 2**

### **WS WILDLIFE DAMAGE MANAGEMENT METHODS**

#### **NON-CHEMICAL**

##### **Cultural Practices**

Lure crops / Supplemental Feeding

##### **Habitat Modification**

Barriers, fencing (conventional)  
Barriers, fencing (permanent electrical)  
Barriers, fencing (temporary electrical)  
Barriers, netting  
Barriers, overhead wires  
Barriers, exclusion (other)  
Manipulation, environmental (food)  
Manipulation, environmental (vegetative cover)  
Manipulation, environmental (water)  
Manipulation, environmental (other)

##### **Behavior Modification (harassment)**

Balloons (all)  
Dog, chase  
Electric harassment devices (all)  
Exploders, gas (all)  
Flags, mylar  
Flags, non-mylar  
Harassment / shooting  
Pyrotechnics (all)  
Scarecrows (all)  
Tape, mylar  
Vehicles (all) (boat, auto, ATV)

##### **Population Management**

Hand caught, (bare hands, snare pole, etc.)  
Harvest, legal  
Nest removal  
Nest, Egg destruction / removal (includes egg addling)  
Nets, cannon / rocket

Nets, gun  
Nets, other  
Shooting  
Spotlighting, night vision equipment / shooting  
Spotlighting, hand caught  
Trap & euthanize  
Trap & release  
Trap, drive / corral  
Trap, other

### **Behavior modification (human)**

Eliminate wildlife feeding

### **CHEMICAL**

### **Behavior modification (harassment)**

Repellent, ReJeX-iT AG-36 (Methyl Anthranilate)  
Repellent, ReJeX-iT AP-50 (Methyl Anthranilate)  
Repellent, ReJeX-iT TP-40 (Methyl Anthranilate)

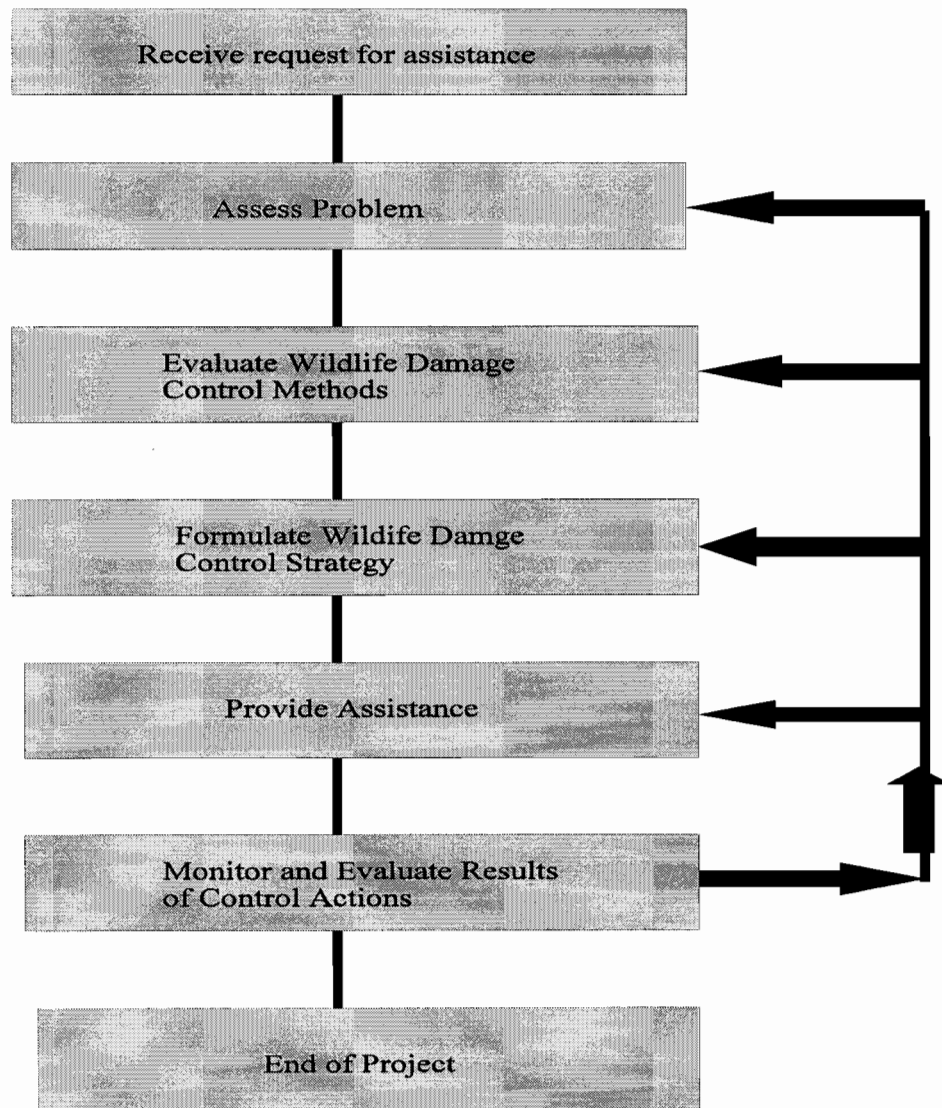
### **Population management**

Alpha chloralose (capture drug)



## APPENDIX 3

### WILDLIFE SERVICES DECISION MODEL



## **APPENDIX 4**

### Section 7 Consultation



March 23, 1999

Nancy Gloman  
Acting Field Supervisor  
U. S. Fish & Wildlife Service  
510 Desmond Drive SE, Suite 102  
Lacey, WA 98501

Dear Ms. Gloman,

The purpose of this letter is to request an informal consultation and concurrence of findings pursuant to Section 7 of the Endangered Species Act for listed and proposed threatened and endangered species, candidate species, and species of concern that may be present within Western Washington. Based on a review of the listings provided by your office, I have analyzed the potential impact of the program alternatives proposed in the Wildlife Services' resident Canada goose Environmental Assessment (EA).

#### Project Area

The EA examines conflict resolutions to alleviate damage done by resident Canada geese, primarily in urban areas, in the greater Puget Sound area. Resident Canada geese refers to a locally breeding population of geese which nest and raise their young in the Puget Sound area.

The Aleutian Canada goose (*Branta canadensis leucopareia*), bald eagle (*Haliaeetus leucocephalus*), brown pelican (*Pelecanus occidentalis*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), peregrine falcon (*Falco peregrinus*), and western snowy plover (*Charadrius alexandrinus nivosus*) may occur in project areas.

#### Proposed Action and Methods

The proposed action would include WS direct control and technical assistance applied on a case-by-case basis to use the most appropriate, effective and biologically sound methods available. This approach is known as Integrated Wildlife Damage Management and is analyzed and discussed in Chapter 1, 1-7 of the Animal Damage Control Program Final Environmental Impact Statement (USDA 1997).



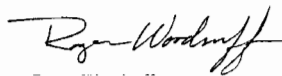
Direct control services provided by WS would include harassment, wire grid installation, egg addling, nest destruction, capture and euthanasia, and to a lesser extent, shooting. Most goose captures would take place during the molt, specifically taking resident geese, as defined. The capture drug, alpha chloralose (AC), would normally be the method used to capture geese outside the molt period. In some settings where problem geese cannot be captured or otherwise controlled, a small number may be selectively removed with pellet rifle or shotgun. There would be no use of pesticides.

### Findings

Upon careful review, I have determined that the proposed project would have no effect on listed endangered or threatened species. Capture and removal methods would allow for positive identification of target animals. The Aleutian Canada goose would not be affected, because WS field personnel are trained in identification of goose subspecies, and the vast majority of captures would occur during months and at locations where the Aleutian Canada goose is not present. The other listed species are easily distinguishable from geese and only rarely occur in the environments where project activities would be most likely to occur (urban and suburban areas). The capture drug, alpha chlorolose, would be used sparingly and only when other capture techniques are not feasible. WS personnel are trained and certified in the use of AC. Alpha chlorolose is administered by hand baiting, which allows for controlled delivery to target geese. Geese which consume baits become tranquilized and are captured. Any uneaten baits are gathered and removed. No secondary impacts of the drug to predatory or scavenging species such as bald eagles are expected, because drugged geese are captured and removed. This project is not anticipated to have any effect on the behavior or biology of any listed species.

We seek your concurrence with our determination that there would be no effect on listed threatened and endangered species. Thank you for your consideration of this request.

Sincerely,



Roger Woodruff

Assistant State Director  
USDA/APHIS/Wildlife Services



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
North Pacific Coast Ecoregion  
Western Washington Office  
510 Desmond Drive SE, Suite 102  
Lacey, Washington 98501  
Phone: (360) 753-9440 Fax: (360) 753-9008

April 19, 1999

Roger Woodruff  
U.S. Department of Agriculture  
Animal and Plant Health Inspection Service  
Wildlife Service  
720 O'Leary Street, NW  
Olympia, WA 98502

FWS Reference: 1-3-99I-0379

Dear Mr. Woodruff:

This letter is in response to your letter and Environmental Assessment on proposed actions to control Canada geese the greater Puget Sound area in Washington. The letter was dated March 23, 1999, and received in this office on March 24, 1999.

The U.S. Department of Agriculture Animal and Plant Health Inspection Service, Wildlife Services, has determined that the proposed project will have no effect on the bald eagle (*Haliaeetus leucocephalus*), Aleutian Canada goose (*Branta canadensis leucopareia*), brown pelican (*Pelecanus occidentalis*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*) peregrine falcon (*Falco peregrinus*) and western snowy plover (*Charadrius alexandrinus nivosus*). The U.S. Fish and Wildlife Service concurs that the proposed project will have no effect on these listed species.

This concluded informal consultation pursuant to 50 CFR 402.13. This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that caused an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

If you have further questions about this letter or your responsibilities under the Endangered Species Act, please contact Jim Michaels at (360) 753-7767.

Sincerely,

A handwritten signature in black ink, appearing to read "Gerry A. Jackson". The signature is fluid and cursive, with the first name "Gerry" being more prominent.

Gerry A. Jackson  
Supervisor

JG/jko  
c: WDFW, Region 4,6  
WNHP, Olympia



United States  
Department of  
Agriculture

Animal and  
Plant Health  
Inspection  
Service

Wildlife  
Services

720 O'Leary St., NW  
Olympia, WA 98502

April 20, 1999

Harriet Allen, Manager Endangered Species Section  
Washington Department of Fish and Wildlife  
600 Capitol Way North  
Olympia, WA 98501-1091

Dear Ms. Allen,

The purpose of this letter is to request an informal consultation and concurrence of findings pursuant to Section 7 of the Endangered Species Act for listed and proposed threatened and endangered species, candidate species, and species of concern that may be present within Western Washington. Based on a review of the listings provided by your office, I have analyzed the potential impact of the program alternatives proposed in the Wildlife Services' (WS) resident Canada goose Environmental Assessment (EA).

#### Project Area

The EA examines conflict resolutions to alleviate damage done by resident Canada geese, primarily in urban areas, in the greater Puget Sound area. Resident Canada geese refers to a locally breeding population of geese which nest and raise their young in the Puget Sound area.

#### Federal

The Aleutian Canada goose (*Branta canadensis leucopareia*), bald eagle (*Haliaeetus leucocephalus*), brown pelican (*Pelecanus occidentalis*), marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), peregrine falcon (*Falco peregrinus*), and western snowy plover (*Charadrius alexandrinus nivosus*) may occur in project areas.

#### State

The Washington Department of Fish and Wildlife designates two additional endangered species which WS has determined to deserve consideration relative to our proposed action. They are: the American white pelican (*Pelecanus erythrorhynchos*) and the greater sandhill crane (*Grus canadensis tabida*)

#### Proposed Action and Methods



APHIS - Protecting American Agriculture



The proposed action would include WS direct control and technical assistance applied on a case-by-case basis to use the most appropriate, effective and biologically sound methods available. This approach is known as Integrated Wildlife Damage Management and is analyzed and discussed in Chapter 1, 1-7 of the Animal Damage Control Program Final Environmental Impact Statement (USDA 1997).

Direct control services provided by WS would include harassment, wire grid installation, egg addling, nest destruction, capture and euthanasia, and to a lesser extent, shooting. Most goose captures would take place during the molt, specifically taking resident geese, as defined. The capture drug, alpha chloralose (AC), would normally be the method used to capture geese outside the molt period. In some settings where problem geese cannot be captured or otherwise controlled, a small number may be selectively removed with pellet rifle or shotgun. There would be no use of pesticides.

### Findings

Upon careful review, I have determined that the proposed project would have no effect on listed endangered or threatened species. Capture and removal methods would allow for positive identification of target animals. The Aleutian Canada goose would not be affected, because WS field personnel are trained in identification of goose subspecies, and the vast majority of captures would occur during months and at locations where the Aleutian Canada goose is not present. The other listed species are easily distinguishable from geese and only rarely occur in the environments where project activities would be most likely to occur (urban and suburban areas). The capture drug, alpha chlorolose, would be used sparingly and only when other capture techniques are not feasible. WS personnel are trained and certified in the use of AC. Alpha chlorolose is administered by hand baiting, which allows for controlled delivery to target geese. Geese which consume baits become tranquilized and are captured. Any uneaten baits are gathered and removed. No secondary impacts of the drug to predatory or scavenging species such as bald eagles are expected, because drugged geese are captured and removed. This project is not anticipated to have any effect on the behavior or biology of any listed species.

We seek your concurrence with our determination that there would be no effect on listed threatened and endangered species. Thank you for your consideration of this request.

Sincerely,

A handwritten signature in cursive script, reading "Roger A. Woodruff".

Roger A. Woodruff

Assistant State Director

State of Washington



## DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207  
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA

April 26, 1999

Mr. Roger Woodruff  
USDA/APHIS  
Wildlife Services  
720 O'Leary Street Northwest  
Olympia, WA 98502


Dear Mr. Woodruff:

This letter is in response to your letter and Environmental Assessment on the proposed actions to control Canada geese, primarily in urban areas, in the greater Puget Sound area in Washington.

The U.S. Department of Agriculture Animal and Plant Health Inspection Service, Wildlife Services, has determined that the proposed project will have no effect on the following state and federal listed species: bald eagle, Aleutian Canada goose, brown pelican, white pelican, sandhill crane, marbled murrelet, northern spotted owl, peregrine falcon, and western snowy plover. The Department of Fish and Wildlife concurs that the proposed project will have no effect on these listed species. The capture and removal methods will allow for positive identification of target animals; if tranquilized baits are used, they can be hand delivered to target geese; uneaten baits will be removed; and no secondary impacts of the drug to predatory or scavenging species are expected because the drugged geese will be captured and removed.

Thank you for the opportunity to comment on this proposed action.

Sincerely,



Harriet Allen, Manager  
Threatened and Endangered Species Section

HA:tl

cc: Lora Leschner  
Jack Smith  
Tricia Thompson  
Michelle Tirhi